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Original Communications

DECIDUAL FORMATION ON THE PERITONEAL SURFACE OF THE GRAVID UTERUS

By J. HOFBAUER, M.D., F.A.C.S., BROOKLYN, N. Y.

(From the Department of Obstetrics, Johns Hopkins University and Hospital)

THE recognition of the appearance of ectopic decidual cells on the peritoneal surface of the pregnant uterus dates back to Pels-Leusden who first described them in eclamptics in 1895. Schmorl, in 1898, emphasized the fact that in the pregnant organism decidual formation is not confined to the endometrium but may also occur at other sites. Of these, the ovaries and culdesac constitute the favorite localities. In recent years Geipel gave an account of the occurrence of decidual in the omentum, the pelvic lymphatic glands and on the appendix. Attention was directed by these writers to the observation that, although in many cases the presence of decidual cells beneath the peritoneal coat can only be recognized microscopically, the reaction may sometimes be so pronounced as to produce papillae, or flat, slightly protruding areas, or even small nodules. Such phenomena have been recorded repeatedly since, particularly as occurring low down on the posterior surface of the uterus in the neighborhood of Douglas' pouch and over the pelvic peritoneum. So, too, J. W. Williams described a case in which the pregnant uterus was the seat of a diffuse adenomyoma and the stroma of the adenomyomatous islands had become converted into typical decidua.

Our interest in the subject was aroused by a number of remarkable clinical observations incident to macroscopically visible decidual formation on the peritoneal surface of the pregnant uterus; and subsequently, by the microscopic findings which revealed several hitherto undescribed details relating to the mode of production of the condition.

NOTE: The Editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

At this point attention may be called to Fig. 1, which shows the condition observed on the left half of the posterior uterine surface of an eclamptic patient at term. The striking feature of the case consists in the presence of an extensive raw area extending from the insertion of the ovarian ligament down to the cervical region below the insertion of the sacro-uterine ligament. The area is triangular in shape, with its base toward the culdesac, and involves both the posterior fold of the broad ligament and the lateral margin of the uterus. It appears as a

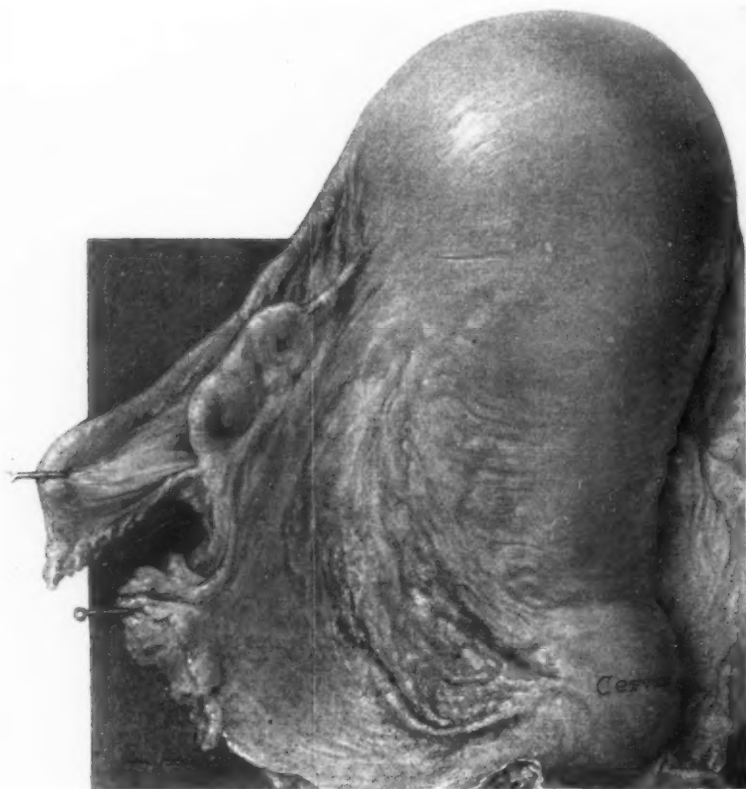


Fig. 1.—Posterior surface of puerperal uterus, showing roughened area of ectopic decidua at the posterior fold of the broad ligament.

roughened ulcer-like layer with thickened, ragged edges, while higher up it is flatter and looks as if its surface had sloughed away. Similar, though somewhat less developed, findings were also present on the right side and corresponded in every feature to the area just described. Fig. 2 gives a diagrammatic representation of the condition.

A similar distribution of symmetrically arranged, denuded areas on the posterior surface of the pregnant uterus was found a few weeks later at autopsy of a young primipara who had developed fulminant toxic symptoms at term. For microscopic study blocks were excised

from the areas involved and serial sections made. In addition, bits obtained from various parts of the omentum, appendix, and sacro-uterine ligaments were imbedded, cut, and studied although these structures had appeared perfectly normal on gross examination.

Having become familiar with the gross appearance of ectopic decidua on the uterine peritoneum, we focused attention during the last year on the detection of velvet-like areas, suggestive of ectopic decidua, on the posterior surface of all pregnant uteri exposed at operation. These areas are readily recognizable with the naked eye on account of their

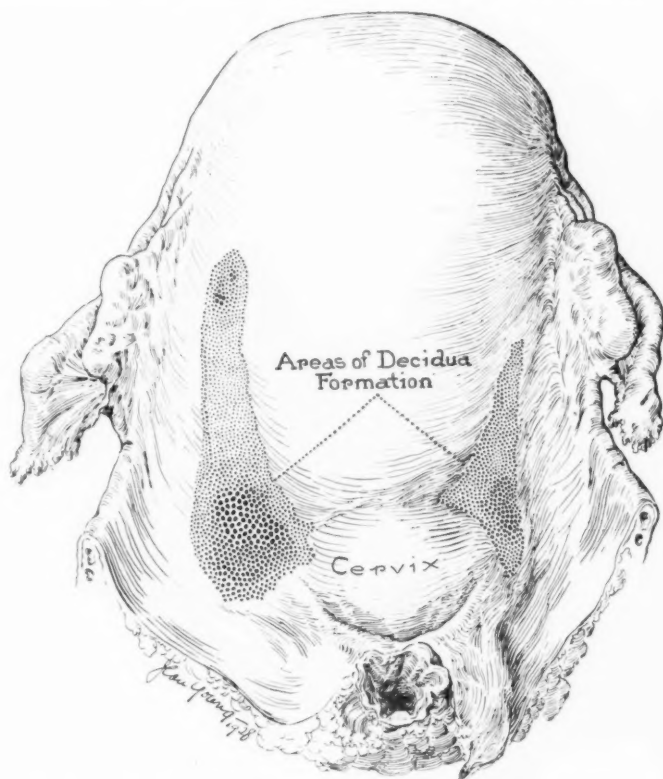


Fig. 2.—Diagram showing decidua formation on the posterior surface of the pregnant uterus.

dull sheen and roughened surfaces. Besides, whenever a pregnant uterus was removed, the lowest portion of its posterior surface was examined microscopically as a routine.

Fig. 3 shows the decidual reaction in the omentum, as seen in the two cases of extensive uterine decidual formation just described. The decidua cells are seen lying beneath the peritoneal covering, clustered together to form groups and associated with small lymphocytes (Fig. 3). The decidual cells are large, of ovoid, oblong or bizarre shape, and contain from one to nine nuclei. The groups of decidual cells do not project

beyond the surface of the omentum and are best seen in its inferior portion near the pelvis, although single cells or even small groups are occasionally found in its upper part. A rich content of glycogen and a tendency toward vacuolization characterize the decidua cell in the omentum. A few elements of decidua were also found in the mesenterium of the appendix while beneath the germinal epithelium of the ovaries larger groups of such cells appeared in places, evidently representing stigmas produced by previously ruptured follicles. Geipel claims to have demonstrated the presence of decidua in the omentum in 90 per cent of his cases, and found its formation especially developed



Fig. 3.—Decidua formation in the omentum.

at the tips of the omentum, sometimes as early as in the third month of pregnancy. In our study the figures are not yet sufficient to permit a definite statement as to the frequency of involvement of the omentum.

Up to the present the development of ectopic decidua on the posterior aspect of the pregnant uterus was found in fifteen of the twenty-three specimens examined. Among these fifteen cases, six showed a wide distribution of decidual reaction: two of them have already been referred to; two others occurred in association with premature separation of the normally implanted placenta with serious clinical symptoms; while the fifth and the sixth patients suffered from nephritic toxemia.

Such extensive involvement of the peritoneum on the posterior surface of the pregnant uterus as was seen in our first cases has not yet been recorded in the literature. Furthermore, upon careful microscopic study of the sections, certain new features concerning the structure in point were established. At the outset it was obvious that the decidual cells in question showed great variation both in size and form. Whereas the ectopic decidua is ordinarily arranged in several layers and in structure closely resembles that of the intrauterine decidua (see Fig. 4), it is the great diversity in shape which constitutes the peculiarity of the decidual formation in the instances under consideration: polygonal, spindle-shaped, ovoid, and exceedingly elongated ameba-like cells with numerous protrusions are frequently seen in the same field.

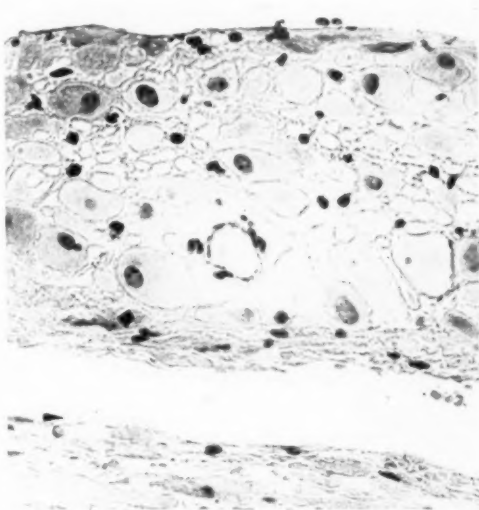
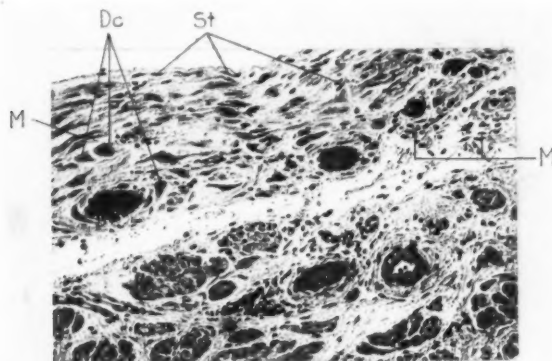


Fig. 4.—Decidua on the posterior surface of pregnant uterus.

Some of the cells have a single nucleus, while others show as many as three to eight, thus resembling giant cells. Vacuoles in the cytoplasm are rather common. Quite frequently the decidual cells extend around small vessels in the shape of a sheath. The covering mesothelium of the peritoneum is well preserved and never shows any participation in the decidual reaction. On the other hand, there is a definite type of small spindle-shaped cells with dark ovoid nuclei and scanty cytoplasm which are present in the connective tissue layer beneath the peritoneal mesothelium, and from which the decidual cells appear to be derived, inasmuch as all stages of transformation from this stem-cell to the various forms of decidua cells are readily demonstrable. The first phenomenon occurring in this transition consists of an increase in the amount of cytoplasm which henceforth retains its characteristic ability to stain

bluish-gray with hematoxylin. Next, the nucleus enlarges and not infrequently undergoes amitotic division, whereupon the further development to the manifold instances of decidua elements progresses.

It is a matter of no little interest that in the same locality phenomena occur which indicate possible transition stages from the stem-cells just described to unstriated muscle fibers. This is rendered probable by the fact that, scattered between the decidua cells or arranged in groups, there can be seen numerous elements which still retain the characteristics of the native mesenchyme cell but, at the same time, show a tendency toward development into muscle tissue by the growth of their cytoplasm which elongates transversely and stains pinkish with eosin. The formation of smooth muscle is first indicated by a marked elongation of some of the nuclei of the mesenchyme cells, which is surrounded



Figs. 5-8.—Microphotographs showing phenomena of development of decidua cells and plain muscle from mesenchymal stem-cells. Dc, decidua cells; M, muscle; St, stem-cell.

by an increase in the amount of granular protoplasm surrounding the nuclei and by the development of rather coarse protoplasmic processes. In the protoplasm of the elongating cells myofibrillae are formed which appear as more or less distinct longitudinal striations and stain intensely with protoplasmic stains. With further development and proliferation regular strands of delicate plain muscle appear in the subperitoneal layer where ordinarily such tissue is lacking. The process of histogenesis of plain muscle structure in situ from stem-cells is visible throughout the entire series of sections.

The conclusion which suggests itself from a consideration of these observations is that we are here dealing with the differentiation into two different structures, viz., decidua and plain muscle, from a single undifferentiated type which has retained its original mesenchymal potencies; and in response to varying stimuli has developed in different

directions. Consideration of photomicrographs in Figs. 5, 6, 7, and 8 serves to exemplify the phenomena observed.

In association with the development of ectopic decidua upon the exterior surface of the uterus there was noted in several instances another phenomenon of considerable interest. The peritoneal endothelium in discrete places had assumed an epithelial appearance with invaginations resembling gland formation. Where these structures are seen dipping into the newly formed decidua the picture presented is almost indistinguishable from decidua vera. It was particularly noticeable in several clinically severe cases of premature separation of the normally implanted placenta that the peritoneal endothelium upon the surface of the uterus had in places become actually cylindrical; and its association with intense development of ectopic decidua both upon the

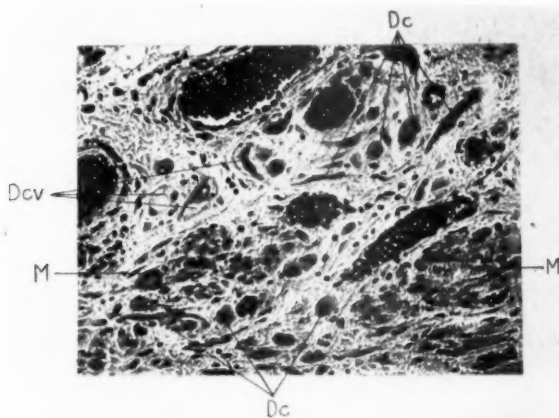


Fig. 6.—Dc, decidua cells; M, muscle; Dcv, vacuolated decidua cells.

posterior wall of the uterus and in peritoneal adhesions presented a striking picture. Furthermore, in several clinically normal cases there appeared within the outermost uterine layer gland-like spaces lined by high columnar epithelium which had lost all connection with the peritoneal covering.

The widespread metaplasia of the peritoneal mesothelium into cylindrical cells in cases of premature separation of the normally implanted placenta is of particular interest since clinical experience has taught us that the presence of abundant blood-stained free fluid in the abdominal cavity constitutes a remarkable feature of that condition. As a corollary, Cunningham has succeeded in showing that, following the repeated injection of foreign substances (glucose, blood) into the peritoneal cavity of animals, metaplastic changes may occur in the mesothelium which result in the formation of one or even two layers of cuboidal

or cylindrical epithelium. The development of similar types of cells in tissue cultures obtained from serosal mesothelium furnishes further proof of the validity of the present view on the embryonic potentialities inherent in mesothelial elements. This statement accords with the belief advanced by Gatenby that in lower animals discrete areas of peritoneal mesothelium may become converted into gonads by processes of transformation and differentiation.

Evidence confirmatory of metaplastic changes occurring in mesothelial cells is likewise to be found in the well-known fact that gland-like structures may develop in the superficial layers of the ovaries of pregnant and nonpregnant women. If we remember that embryologic study gives considerable support to the view that the three structures,

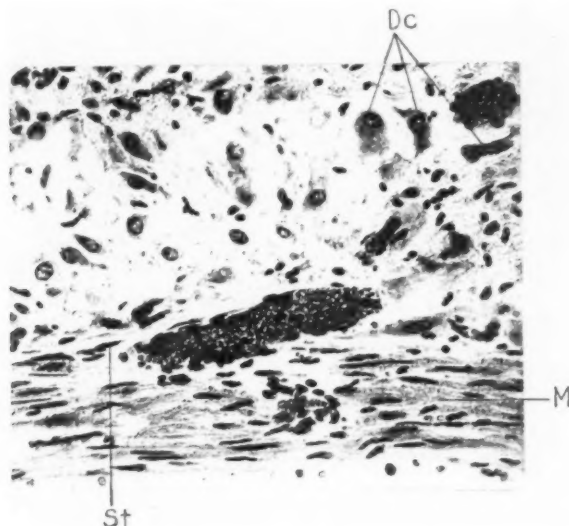


Fig. 7.—Dc, decidual cells; M, muscle; St, stem-cell.

pelvic peritoneum, germinal epithelium, and uterine epithelium, can be regarded as derivatives of the celomic epithelium, it becomes apparent that under the influence of certain stimuli identical differentiation may occur in one or all of these elements.

The developmental potentialities of the subcelomic mesenchyme cells may therefore manifest themselves in two ways, as herein recorded, viz., in the formation of decidual cells and of unstriated muscle. It remains to be emphasized that the presence in the adult of undifferentiated mesenchyme cells in the omentum has been established by the studies of Maximov, Seifert, and others. Hence, the decidual reaction of the omentum during pregnancy may be regarded as a response of those elements to the same activating stimulus as is concerned in the production of both ectopic and intrauterine decidua.

Our present knowledge of the nature of the activating principle in the initiation of decidua formation is admittedly imperfect. The experimental work of L. Loeb suggested that the hormone of the corpus luteum might be the responsible factor. F. B. Mallory claims that absorption of a chemical substance (a hormone) secreted by the chorionic epithelium may stimulate fibroblasts to proliferate and become transformed into decidual cells. If this be the case, it is conceivable that diffusion of this hormone from the uterus by way of the oviduct may cause decidual formation on the outside of the uterus. Recent evidence, however, would seem to point to the anterior lobe of the hypophysis as the stimulating element. In this connection there are three things to be remembered: In the first place, the experimental work of Zondek and Aschheim with repeated transplantation of anterior hypophyseal substance into virgin rodents shows that the formation of decidua

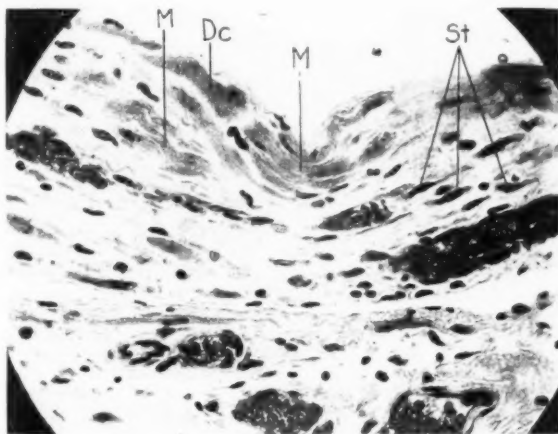


Fig. 8.—Dc, decidua cells; M, muscle; St, stem-cell.

in the uterine mucosa is a constant feature. Second, in nonpregnant women suffering from acromegaly, due to overgrowth of the anterior lobe of the hypophysis, the occurrence of typical decidual nodules in the culdesae has recently been described by Wagner. Finally, the observation made in the present study that, in certain types of toxemia of pregnancy, ectopic decidua represents rather a common occurrence may possibly be taken as evidence in support of the modern conception that a hyperactivity of the pituitary gland may play a part in the production of eclamptic and preeclamptic conditions (Hofbauer, Küster, Eufinger). If we consider this view in conjunction with the recent conception advanced by Evans, Hofbauer, Zondek, Ph. Smith, that it is the anterior lobe of the hypophysis per se which controls ovarian

activity and stimulates both formation and function of the corpus luteum, it would seem that we have obtained a clue toward the solution of our problem.

In conclusion, it is interesting to recognize the marked resemblance which exists between the topographic distribution of ectopic decidua and endometriosis. From the observation made in the present investigation that the production of aberrant decidua is due to a development in situ from mesenchyme elements, which have retained their embryonic potentialities and which may result in the formation of glands, decidual cells and muscle, it follows that the etiology of endometriosis may be considered from a similar point of view. These remarks must not, however, be taken to imply that we do not accept the theory of implantation in many instances of endometriosis. As a matter of fact, we do. On the other hand, basing my argument on the local development on the posterior surface of the pregnant uterus of structures resembling uterine decidua, I am inclined to favor the theory that, given the proper stimulus, the local elements, both mesothelial and mesenchymal, may possibly take some part in the formation of ectopic endometrial tissue. This stimulus, according to Cunningham, may be the presence of blood. It is common knowledge that a reflux of menstrual blood through the tubes into the pelvic cavity occurs not infrequently. This blood may be the etiologic element involved in that stimulation of the mesothelium and mesenchyme which results in endometriosis in some instances. Experimental study to decide this question is now under way.

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CHOLECYSTOGRAPHY AS AN AID IN DETERMINING GALL BLADDER STASIS IN PREGNANCY*

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THE greater incidence of cholelithiasis in women, is undoubtedly secondary to pregnancy. Courvoisier found cholelithiasis present in every fourth woman and in every twelfth man in 16,025 autopsies. Schroeder found gallstones in 20 per cent of all females and 4.4 per cent of all males autopsied. W. Mayo reports that 90 per cent of 3075 female gall-bladder patients had their first symptoms during pregnancy. Peterson in 1910 reviewed this subject and reported his observations based upon the examination of the gall bladders of women he operated upon for a gynecologic complaint. He found that pregnancy increased the incidence of gallstones about 10 per cent, and further determined that about one-third of the patients could report the onset of a biliary attack when the uterus reached the umbilicus, thus pressing upon the gall bladder and biliary ducts.¹⁴

Of all the possible factors in pregnancy which can be blamed in the etiology of gallstones, stasis is generally accepted as most significant. Practically all authorities agree that such a stasis is present but differ in explaining its origin. Prior to the last few years the general consensus of opinion was that this stasis resulted from mechanical pressure of the gravid uterus upon the gall bladder or its ducts. Cannon in his text upon mechanical factors in digestion demonstrated that an increased intraabdominal pressure would affect the gall bladder and ducts equally, thus eliminating itself as a factor in causing stasis.

In 1922 Westphal¹⁰ fluoroscoped gravid women in the ninth month of pregnancy when the uterus was highest and noted that quite frequently there was no direct pressure of the uterus upon the lower liver surface. In his experimental work he demonstrated an increased tone of the sphincter of Oddi and believed that in this way bile was dammed back into the biliary system.

With the advent of cholecystography and with Boyden's observations upon the emptying of gall bladders by fat meals,¹ there was afforded, for the first time, the opportunity of definitely observing the behavior of the human gall bladder and noting whether or not there was stasis present as compared to normal. It is of interest that recently Mann and Higgins¹² in animal experiments, using 40 per cent iodized oil, found that pregnancy consistently delayed the emptying time of the gall bladders and that balloons the size of the gravid

*Read at a meeting of the Chicago Gynecological Society, June 22, 1928.

uterus affording the same pressure upon the gall bladder as does the gravid uterus failed to cause this delayed emptying time.

This is, to me, the first scientific demonstration of the so-called stasis (excepting Westphal¹⁹) which appears during pregnancy. My personal experiences with exactly the same experiment in a large series of guinea pigs have failed to give such consistent results and can supply no conclusions. Whitaker and Emerson tried this same experiment in pregnant cats and found that iodized oil would drain out of the gall bladder during pregnancy if the animals were in good condition. In general this would be my conclusion from my animal experimental work.

While this was being done, however, it seemed advisable to attempt, among our prenatal dispensary patients, the visualization of the gall bladders and, providing stasis was present, to determine the effect of fat meals upon their emptying time. In addition to these dispensary patients others were available and were used in the same experiment. Unfortunately the oral method of cholecystography had to be used as the danger of inducing abortion in ambulatory patients from possible reaction to the dye injected intravenously could not be hazarded.

Any patient who vomited was omitted from this series, thus making certain that the dye was ingested in all cases recorded. Failure to visualize the gall bladder then rested upon failure of the dye to reach the gall bladder or its inability to concentrate sufficiently to cause the dye to cast a shadow. Failure to absorb the dye from the gastrointestinal tract must be considered. This is an important factor which would cause failure of visualization of the gall bladder, especially since the dye is absorbed practically entirely in the ascending colon and constipation, which is so frequently associated with pregnancy, hinders dye absorption. The secretory power of the impaired liver, which is undoubtedly adequate in healthy ambulatory women, cannot be considered as a cause of failure. The point of interest was: Would the bile be able to enter the gall bladder, or would the cystic duct be obstructed; was stasis present, and if it were present, could it be alleviated by stimulating the gall bladder into draining its contents by the customary fat meal?

TECHNIC

Bromeikon was used in twenty-three dispensary patients. Its continued use was the control afforded by the fact that over 80 per cent of the patients with an upper abdominal lesion, which was suspected in the gall bladder or gastrointestinal tract, gave an excellent gall-bladder shadow. The dosage of bromeikon was five grains in gelatin capsules per twelve pounds of body weight; all patients who were nauseated enough to vomit were eliminated. In addition to these twenty-three patients receiving bromeikon, twenty-three other pa-

tients were given iodeikon, a dye equally as reliable, four of the patients receiving the dye intravenously. The other patients were given 3 gm. of sodium tetraiodophenolphthalein in a colloidal suspension as described by Fantus,³ a method which gives about 90 per cent gall-bladder visualization in nonpathologic gall bladders.

CHOLECYSTOGRAPHY RESULTS

Iodeikon	Failed to visualize	17	6
	Visualized		
Bromeikon	Failed to visualize	16	7
	Visualized		
Sodiumtetral in colloid	Failed to visualize	9	1
	Visualized		
Sodiumtetral intravenously	Failed to visualize	1	1
	Visualized		
	Total failing to visualize	43	
	Total visualizing		15

Duration of pregnancy in visualized cases, average $5\frac{1}{2}$ months.

Duration of pregnancy in nonvisualized cases, average $6\frac{1}{2}$ months.

From the tabulated results, the first significant feature is the surprisingly high percentage of failures in gall bladder visualization. Only 22 per cent of our patients gave a visible shadow, as contrasted to our controls in which 20 per cent did not give a shadow (reversal of results). Moreover, it is of interest that the percentage of failures increased as pregnancy continued. In the case in which pictures of successive months are shown, there is a definitely fainter shadow in the second picture. Moreover, it was of special interest that no gall bladder shadow was obtained after seven and one-half months of pregnancy, although fourteen were attempted; four patients who gave excellent gall bladder shadows in the fourth and fifth months failed to visualize in the seventh and eighth months. Gall bladder shadows were obtained in fifteen cases and following a fat meal (supplied to all patients by the university dining room, consisting of an eggnog containing two eggs, half a glass of cream, and butter fat); it was noted that the gall bladder consistently emptied in time accepted as normal for nonpregnant individuals.

COMMENT

An explanation of the high percentage of failures in the visualization of the gall bladder can only be attempted. Perhaps the factor is present during pregnancy which Orator¹³ believed present in definitely surgically established duodenal ulcers which showed at operation normal gall bladders but still in 60 per cent of the cases showed defective gall bladder shadows. This is explained by a hypersecretion present even in fasting state which stimulated emptying of the gall bladder pre-

venting concentration of sufficient dye to cast a shadow. Perhaps this is also a factor in pregnancy. Colonic stasis may explain the failure to fill of this high percentage of gall bladders, but it cannot explain

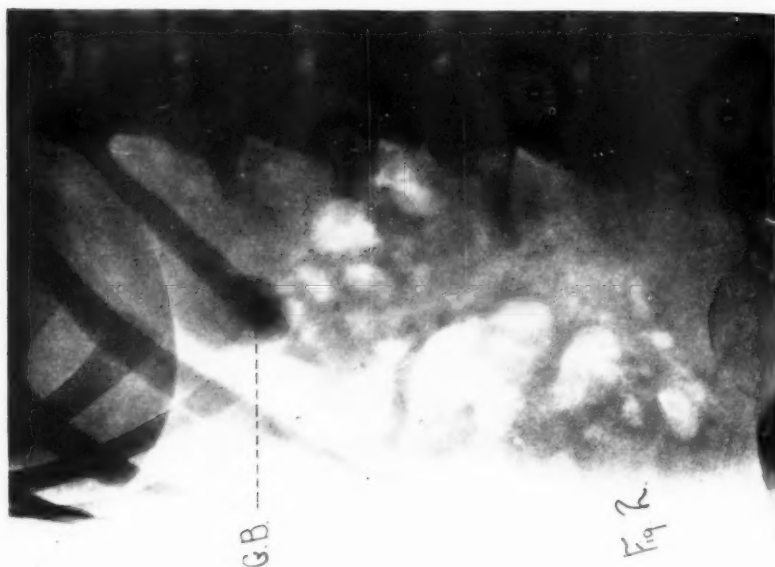


Fig. 2.—Same patient as in Fig. 1, but two hours after fat meal and twenty hours after ingestion of dye, smaller and fainter shadow than in Fig. 1.



Fig. 1.—Patient, N. K., in fifth month of pregnancy, seventeen hours after oral ingestion of dye, excellent gallbladder visualization.

the high percentage of failure when the dye was injected intravenously. But I do not feel that four cases afford the slightest basis for an opinion on this subject of cholecystography which together with the physiology

of pregnancy would be too extensive a subject for this paper. What was of prime interest to us was the response of the gall bladders which were visualized.

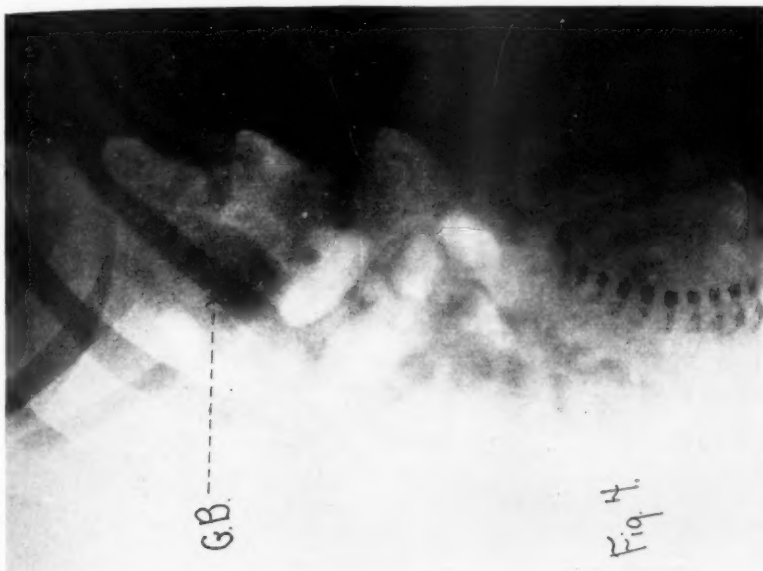


Fig. 4.—Same patient as in Figs. 1, 2 and 3, eighteen hours after ingestion of dye, shadow now visible is much fainter but of same size as in Fig. 1, even though fetal parts are visible and there should be some pressure upon the gall bladder from the uterus.

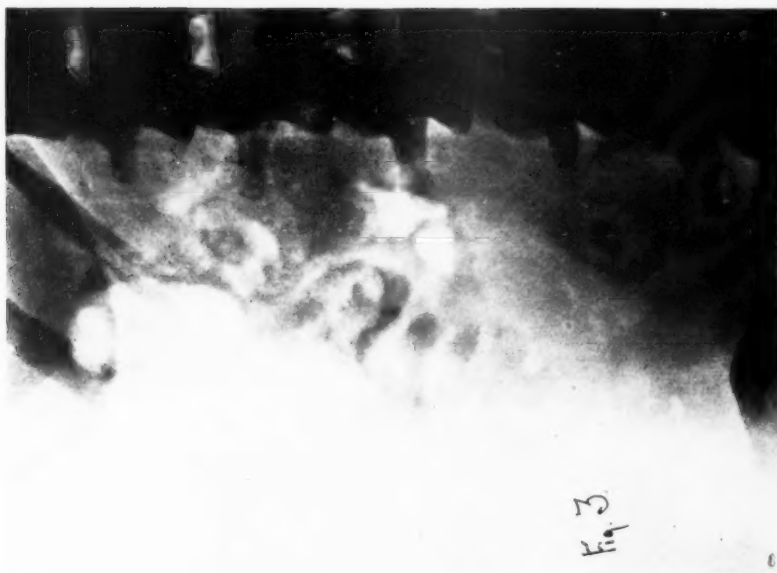


Fig. 3.—Same patient as in Figs. 1 and 2 but now in sixth month of pregnancy. Fifteen hours after ingestion of dye no visible shadow although same amount of dye was ingested as in Fig. 1.

Every gall bladder visualized responded to a fat meal in a normal fashion. Three hours after the fat meal the gall bladders were practically empty regardless of stage of pregnancy. Fig. 2 shows excellent

response in fifth month of pregnancy; Fig. 4 in sixth month and Fig. 8 in seventh and one-half month of pregnancy. Had stasis been present, these shadows would have become more dense with the concentration

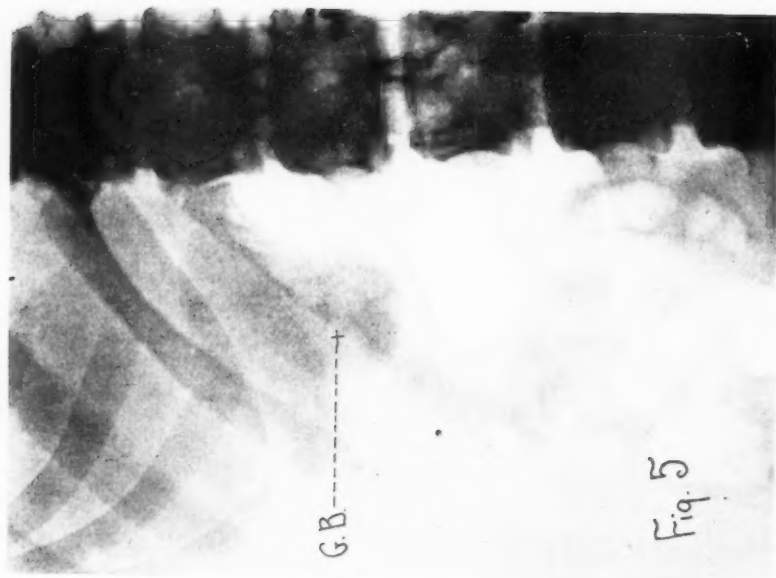


Fig. 5.—Patient, E. E., in fourth month of pregnancy, seventeen hours after oral ingestion of dye, faint large shadow.

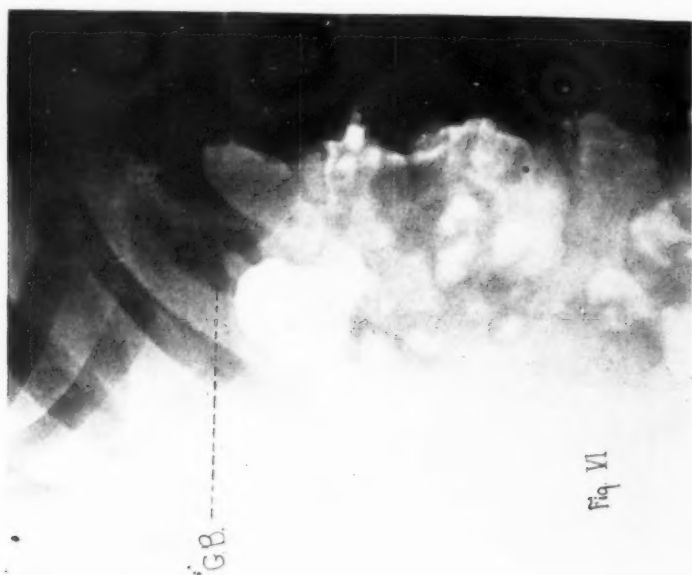


Fig. 6.—Same patient as in Fig. 5, two hours after fat meal and twenty hours after ingestion of dye, shadow almost gone.

of the dye. Now that Ivy⁹ has shown that the gall bladder will respond to an acid extract of the duodenum, it is reasonable to expect better and more rapid response than was obtained by fat meals.

Of further interest was the shape of all the gall bladders visualized. None of them showed any evidence of mechanical pressure from the growing uterus. The gall bladder seen in Fig. 4 is approximately the

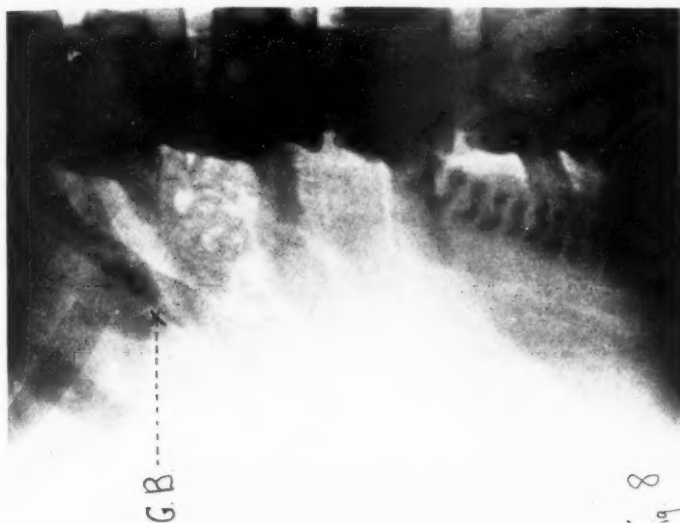


Fig. 8

Fig. 8.—Same patient as in Fig. 7, two hours after fat meal and twenty hours after ingestion of dye, shadow practically gone.



Fig. 7.—Patient, A. H., about seven and one-half months pregnant, large but faint shadow of gall bladder fourteen hours after ingestion of dye. Note that although uterus has risen above the lower border of gall bladder there is no pressure defect in the latter.

same size as that seen in Fig. 3, despite the fact that the uterus had grown to the level of the umbilicus during the six weeks' interval between the two pictures. The gall bladders seen in Figs. 7 and 8 are

of unusual interest as here, particularly in Fig. 7, the upper border of the uterus can be seen to extend higher in the abdomen than the lower border of the gall bladder without any apparent mechanical pressure or x-ray defect in the gall bladder shadow.

This was true in every case in which a gall bladder shadow was obtained and in which the uterus was high enough in the abdomen to reach the gall bladder. It is inconceivable to me that any pressure which is insufficient to disturb the outline of such a soft organ as the gall bladder can be much of a factor in the development of stasis.

CONCLUSIONS

1. Positive Graham-Cole gall bladder tests in pregnancy (the failure to visualize) should be skeptically accepted as proof of gall bladder pathology.
2. Stasis in the gall bladder of pregnancy was not seen in the gall bladders visualized in this experiment.
3. What stasis may be present is certainly combated by the response of the gall bladder of pregnancy to fat meals.
4. Even when the gravid uterus rises above the lower gall bladder border, it does not exert enough pressure to disturb the normal gall bladder outline.

I wish to thank my colleagues, Dr. Bronson and Miss Falk, at the Northwestern University Medical School, whose assistance made this work possible.

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(For discussion, see page 731.)

A STATISTICAL AND CLINICAL STUDY OF ONE THOUSAND CASES OF STERILITY*

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IT IS the purpose of this paper to discuss as briefly as possible an analysis of one thousand cases of sterility. The cases are taken entirely from the private practice of the writer and of his partner Dr. Edward Reynolds. They are consecutive cases up to and including April 1, 1928, and are absolutely unselected.

It will perhaps be wise at the start to mention some of the difficulties which attend an attempt of this kind. In the first place the numbers are not sufficiently large as far as some of the smaller groups are concerned to be significant. At the present time there is no remedy for this. The writer has already deliberately waited several years until the total cases accumulated should exceed a thousand so that this defect might be remedied as far as possible. To any student of the problem it is evident that as a rule private patients are the only ones willing to spend the time and undergo the discomforts necessary to a complete investigation. For this reason statistics from out-patient clinics are rarely of any value. Another difficulty arises from the fact that for many years these records were taken without thought of a possible study. Hence the negative data have often been omitted, making the compilation of tables extremely difficult. Furthermore the writer cannot lay claim to a mathematical or biometric background such as is an essential for an undertaking of this kind.

These difficulties would seem sufficiently great in any ordinary medical study, but in sterility there are others inherent in the subject itself which must be faced if not overcome. In medicine a clinical entity can be classed and described under one name; in sterility, however, our patient is not a single individual but a couple, each one of whom may be a distinct problem. They cannot be classed as individuals since it is only in their relationship that sterility arises. In medicine we like to limit our diagnosis to a single disease or pathologic process and usually we can do so. But in sterility it is extremely common to find a number of conditions (e.g. retroversion and obesity) existing in the same patient either one of which might be sufficient to produce sterility, or again we may find pathologic conditions with both husband and wife (e.g. endocervicitis and prostatitis), either one of which would similarly be an adequate finding.

*Read (by invitation) at a meeting of the New York Obstetrical Society, November 13, 1928.

For lack of space it has been found necessary to abridge this article. The complete paper may be had in the author's reprints.

This brings me to a part of the problem which is most often misunderstood by patients and even by doctors themselves, that is the diagnosis of sterility—the giving a name to the condition which is causing the failure to reproduce. The difficulty can best be illustrated by giving a typical case history opinion as given to a couple who have been examined for inability to have children.

* * * *

In the first place patients must realize that certain pathologic conditions, whether remediable or not, may give rise to absolute sterility in an individual. By far the larger proportion of individuals, however, are not sterile though they may show some pathologic condition. If there is only one in either partner, classification becomes easy, and it may be confidently asserted that fertility has been reduced by this pathologic condition and that if it is susceptible of removal there is reason to believe that fertility will return to normal. In practice, however, it is rare to find only a single pathologic condition. We may find a badly lacerated cervix and a retroverted uterus, or, as in the illustration, some metabolic disturbance with overweight, scanty periods, anemia, etc., on the one side, and a mild catarrhal condition of the prostate with overwork on the other. At this point it is well to emphasize the fact that there is no pathologic condition, except such obvious things as closure of the tubes or of the vasa deferentia, or something of the sort, in which pregnancy has not been known to occur however infrequently. The best way in which to think of the relationship of some pathologic condition to fertility, as for instance that of retroversion, is to say that given a hundred cases of the particular lesion in question the incidence of conception would be reduced over what occurs in normal women to a greater or lesser degree.

The best hypothesis that we have been able to put forward to explain sterile marriages under conditions of this sort is the one which we proposed in 1920 of relative fertility.¹ We believe that the fertility of an individual (and following Raymond Pearl² this should probably best be called fecundity and the term fertility be limited to the description of a mating) can be represented on a percentage basis. There are few individuals who are 100 per cent. The fecundity of most for one reason or another would be considerably less, often much less. With the man by counting the number of spermatozoa per cubic centimeter in the semen and other similar quantitative tests we have actually been able to make such estimations. With the woman the difficulty is vastly greater. No one has ever seen a live human egg cell after it has left the ovary except at operation. However, by careful and thorough examination and evaluation of such functional data as those of menstruation, acidity, size of ovaries, etc., it is possible to make a reasonable guess.

The chance for having children, or the fertility of the marriage, we believe to be best approximated by multiplying the fecundities of hus-

band and wife. If the resultant figure is much below 50 per cent, we do not expect children. If it is much above we almost invariably have them. There is of course a doubtful region in the neighborhood of 50 per cent where children may, or may not, come but where the chance for miscarriage due to defective germ plasm is greatly increased.

This hypothesis explains cases similar to the one quoted above, but it does not help us very much when we come to make a classification of cases on any pathologic basis. I am inclined to believe that such a pathologic classification is of little real value and that the time will come when all cases will be classed from a physiologic point of view only. At the present time we simply do not know enough to make this sort of classification. There is therefore nothing else for us to do but to make the best of a bad situation.

The classification of pathologic diagnoses must in the nature of the case be an artificial one. If all the items of diagnosis are listed separately we will have a total many times the actual number of cases. Such a list could give us no possible conception as to which pathologic conditions were of greater importance in reducing fecundity. On the other hand if we simplify to a single diagnosis in the case of an individual, we will miss those associated factors which undoubtedly influence the net result; furthermore we at once come to the difficulty that both partners may be equally responsible in the causation of the sterile marriage.

* * * *

What then shall be the method of classification which will give the most accurate representation of conditions as they actually exist? I believe that there is no absolutely perfect method but that the one suggested by Dickinson and Cary with certain changes will come nearer to the truth than any so far devised. The older methods have a certain utility and for that reason they will also be used in reporting this series. With the earlier cases it is the only possible method, since accurate methods of semen examinations have only been used for some three hundred cases. In practically every case in this whole series something was known of the fertility of the husband. The methods used in determining this did not lend themselves to accurate tabulation; for instance, many depended on the Hühner¹³ or postcoital test. This we have since found to be inadequate as a means of diagnosing male fertility though it still retains its place as a test of function. With the last three or four hundred cases we have figures in regard to the semen for each diagnosis with the woman whether normal or pathologic.

Having now discussed the difficulties of classification let me turn to the even greater difficulties inherent in the reporting of the results of treatment. What is to be the criterion of whether a case is to be recorded as a success, a failure, or one which has not been treated at all?

Up to the present time only three authors have reported their results with any large series of cases. As has been already noted Polak⁵ in 1916 reported a series of 798 cases, Hunner and Wharton¹⁰ in 1924 a series of 526, and Dickinson and Cary¹¹ in 1927 a series of 788. In each instance a large proportion of the total cases had to be excluded for one reason or another. The authors were not always clear as to the exact reason why these exclusions were made, and this must necessarily impair the value of their conclusions. Rather than begin by cutting down the total number of cases for this reason or that, while keeping intact the number of successful ones, it has seemed fairer to give in all instances the crude statistics first; number of cases seen and number of pregnancies. Next the result of the pregnancy should where possible be included as full term, miscarriage, or blighted ovum. Then, and only then, may the hopeless or untreated cases be excluded.

* * * *

We now come to the actual classification of the 1070 case histories on which this report is based. It must be remembered that the diagnoses would undoubtedly be different in many of the earlier cases had they been examined by modern methods. Where, however, definite pelvic pathology was found, and this was almost always the case with these earlier patients, the chances are that that diagnosis is correct. It is only when an attempt is made to correlate this with the causes of the sterility that an error is likely. The first, and one of the most natural attempts at the classification, is to divide up the cases according to whether they were chiefly of male, female or combined origin. The total result is that there were 197 pure male cases, 619 female cases, and 186 cases where both husband and wife were at fault; 68 were incomplete.

From one point of view the males should undoubtedly be held even more responsible for the occurrence of sterility than has been our habit in the past. We have long believed that nonvenereal infections of the male tract could be transmitted to the woman and have recently made a statistical study of the last 642 cases having a complete male history, and where the presence of genital infection in either husband or wife could be demonstrated. We found such infection present in 104 men and in 34 of their wives, a proportion twice as great as the proportion in which pelvic infection in the woman occurred in relation to the total number of cases (18 per 100). It seems to us that this is altogether too large a proportion to be accounted for on any chance basis, and we believe that there must therefore be a relationship between these two facts.

The simplified diagnoses have been combined in Table I by choosing what seemed to be on final analysis the single most important element in the case in relation to the causation of sterility. This cannot help giving a false impression to a certain extent, particularly in regard to simplicity. As a matter of fact cases are far more complex than are

TABLE I. DIAGNOSES

ITEM	FEMALE AND COMBINED DIAGNOSIS	NUMBER	PERCENTAGE OF TOTAL DIAGNOSES	MALE FERTILITY (SPERM COUNT)			
				0-25	25-50	50-75	75-100 OR MORE
1	Cervix (mechanical injuries, stenosis, hypertrophy, etc.)	33	3.1%	1	3	3	3
2	Cervix, anteversion	88	8.3%	1	8	5	4
3	Cervix, endocervicitis	55	5.2%	2	7	10	9
4	Uterus, underdeveloped, double, endometritis	51	4.8%	3	1	6	9
5	Uterus, fibroids	56	5.2%	5	4	2	4
6	Uterus, retroversion	138	12.9%	2	15	12	15
7	Tubes, closed	144	13.4%	3	7	11	16
8	Ovaries, cystic	97	9.1%	2	6	6	12
9	Congestion	44	4.1%	2	2	2	7
10	Age	15	1.4%	1	2	0	2
11	Obesity	52	4.9%	0	4	15	14
12	Underweight	10	0.9%	0	1	2	5
13	Anemia	16	1.4%	0	1	1	6
14	Miscellaneous	6	0.6%	0	0	1	4
15	Female, normal	197	18.3%	49	20	12	15
	Male diagnosis						
	a. Vesiculoprostatis	57	5.3%	8	12	7	13
	b. Varicocele	7	0.7%	3	1	2	0
	c. Developmental defects	3	0.3%	1	1	0	0
	d. Oligospermia	45	4.2%	2	3	1	0
	e. Aspermia	44	4.1%	30	0	0	0
	f. Gonorrheal epididymitis	4	0.4%	3	0	0	0
	g. Age	1	0.1%	0	0	0	0
	h. Impotence	16	1.4%	0	0	1	1
	i. Constitutional	20	1.8%	2	3	1	1
16	Incomplete	68	6.4%	0	0	0	0
	TOTALS	1070	100.0%	71	81	88	125
	Male 197.	Combined 68.	Incomplete 68.	Grand Total 1070.			
	Female 619.	Combined 186.	Incomplete 186.				

here indicated. The table is useful in giving a bird's-eye view of the whole subject. It will be noticed at once that the number of cases in which male fertility has been determined for each female diagnosis falls far short of the total. The reason for this is that we have only listed those cases as far as fertility is concerned in which an actual sperm count had been made, believing that previous methods were too inaccurate to warrant classification. It will be understood that for mechanical reasons the male diagnosis must be omitted unless the female diagnosis is normal, but in those cases where the female diagnosis is given alone the functional condition in the male is noted for those cases in which a sperm count is recorded. If one is interested in the woman alone, one must read instead of the 197 cases where the male diagnosis is given alone, female normal. On the other hand, if one is interested in the male alone, it can be said that there were 619 normal men as far as any pathology was concerned though their fertility varied a good deal according to individual circumstances. There were 197 in which the pathologic diagnosis is given, and there were 186 more in whom some trouble was found, the nature of which could not be indicated in the table, but which was similar to the list given for the 197 straight male cases.

In order to correct the false impression given by Table I it is necessary to give further details about each item.

Under Item 1, cervix, there are 1 case of absolute stenosis, 20 cases of laceration, 3 cases of laceration in which congestion was also an important element, 8 of laceration with retroversion, and 1 of hypertrophy. This makes the total given of 33. In addition there was 1 case of lacerated cervix where fibroids were also present, but this was listed under fibroids so that there might not be a duplication of diagnoses. This same system will be followed in recording each of the other items listed in Table I, namely, the total will be given as in the table showing how it has been made up, and then additional diagnoses will be listed in the body of the paper in which that same condition was present but where because of some other more important condition that particular series of cases was listed in the table under another diagnosis.

Item 2. Cervix, antelexion. There were 60 cases of simple antelexion, 15 of which had what is called pinhole os. There were 28 additional cases which had a mild endocervicitis, but in which the endocervicitis seemed to be directly secondary to the antelexion. These totaled the 88 shown in the table. Additional cases in which antelexion was a partial factor were antelexion and ovaries 39, antelexion and tubes 6, antelexion and fibroids 4.

Item 3. Cervix, endocervicitis. Fifty-five cases as listed, but with additional cases in which the endocervicitis was of secondary impor-

tance as follows: endocervicitis-cystic ovaries 7, endocervicitis-fibroids 1, endocervicitis-congestion 4, endocervicitis-anteflexion 28, endocervicitis-retroversion 3.

* * * *

Item 11. Was made up of 52 cases, all of which were obese and complained of scanty menstruation. Many had poor diets; many had low metabolism. Cases listed under this item and under Item 12 and a good many under Item 13 would by many be listed as cases of endocrine disturbance. With our present inadequate knowledge as to the real underlying causes they have been grouped in the manner indicated.

Item 12 consisted of 10 cases which were markedly underweight and had scanty menstruation as well. There were of course many other cases showing underweight or overweight, but since menstruation was normal in these they were not included here. The total of these cases is shown in Table II.

Item 13 consisted of 16 cases of anemia of sufficient severity to affect menstruation and therefore presumably fertility. Here again there were, of course, many other cases where anemia was a factor.

Item 14 was made up of 6 cases, 1 of which was a severe case of diabetes, severe enough in the opinion of the writer to be a cause for sterility. The other 5 cases were negative as far as any gross pathology of either husband or wife was concerned, but the wives all showed quite extreme nervousness of one kind or another sufficient to include them in the psychoneurotic group. All the rest of the cases were entirely male.

Item 15 *a* was made up of 57 cases of vesiculoprostatis, in some of which the prostate predominated, but in others of which the vesicles were involved either alone or in combination with the prostate. This does not represent the total of these cases which were seen. As has been said the husbands were partially at fault in 186 of the 805 cases which had been listed in items 1 to 14 inclusive, and some of these had vesiculoprostatis. These same remarks apply to the other sub-items under 15.

Item 15 *b* consisted of 7 cases of varicocele so severe as seriously to affect fertility. This will be obvious in observing the sperm count, two-thirds of which were less than half the normal.

Item 15 *c* was made up of 3 cases showing developmental defects, 1 a hypospadias and 2 cases of undescended testicles.

Item 15 *d* consists of 45 cases of oligospermia. This is admittedly a failure of complete diagnosis and classification. It is made up chiefly from the earlier cases so that the cause of the oligospermia was unknown. It is obvious from a perusal of the male fertilities recorded in Table I that oligospermia (if one may define it as showing a sperm count of less than 50,000,000 per cubic centimeter) represents a very large proportion of the total. For instance, excluding the

aspermias, there are recorded in Table I 335 sperm counts, of which 122 (36.4 per cent) fall in this group. Needless to say these cases have in the actual records been thoroughly diagnosed as far as our present knowledge will permit.

Item 15 *e* included 44 cases of aspermia. This represents the total number of these cases without regard to causation. As far as is known the etiology of these cases was as follows: Gonorrhea 18 cases, 47.4 per cent; undeveloped 7 cases, 18.4 per cent; mumps 5 cases, 13.2 per cent; varicocele 3 cases, 7.9 per cent; secondary to poor condition 3 cases, 7.9 per cent; syphilis 1 case, 2.6 per cent; and x-ray 1 case, 2.6 per cent. The rest were unexplained.

Item 15 *f* is 4 cases known to have had gonorrheal epididymitis but in which a few spermatozoa were found.

Item 15 *g* consists of 1 case where the sterility was due to the fact that the man was over seventy years old.

Item 15 *h* is made up of 16 cases of impotence where this was so complete as to be an absolute cause for sterility. It so happened that we were able to get sperm counts on two of these cases by examining a nocturnal emission and found that as far as numbers were concerned they were not much below the average.

Item 15 *i* is a miscellaneous group of 20 patients made up of 6 cases of syphilis, 4 cases of diabetes, 2 cases of chronic nephritis and 8 which were without pathology but were so seriously overweight or underweight that fertility had been affected.

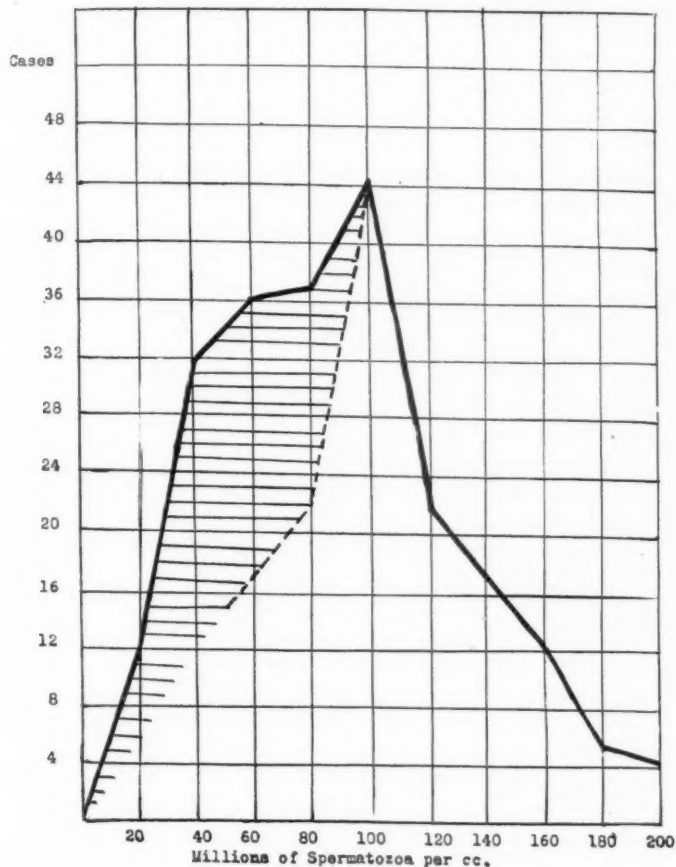
This completes an amplification of material shown in Table I. The percentage occurrence is given after each item. The sum of items 15 *a* to *i*, 197 or 18.3 per cent, represents the number of normal women seen in this series, although it should be said that many of the others deviated only very slightly from the normal.

TABLE II. UNDERWEIGHT AND OVERWEIGHT FIGURES FROM THE EXAMINATION OF 730 COUPLES

POUNDS	UNDERWEIGHT		OVERWEIGHT	
	WOMEN	MEN	WOMEN	MEN
5-9	10	2	13	3
10-14	52	22	33	19
15-19	31	16	37	15
20-24	18	14	34	25
More than 25	19	19	70	47
Totals	130 (17.1%)	73 (10%)	187 (25.6%)	109 (14.9%)

Most of the other tables need little comment. It is interesting, however, to note from an examination of Table II that in general the women deviate from normal to a much greater extent than the men in both directions, though those who are overweight distinctly predominate. The well-known correlation between obesity and sterility receives striking confirmation from these figures.

Fig. 1 shows in graphic form the results of the spermatozoa counts. The cases of aspermia have been left out as they would obviously spoil the symmetry of any curve. The solid line represents the counts of normal and abnormal individuals. It is obvious that the shaded portion at least is due to the fact that while this curve is made up from a certain number of normal individuals, it also included many abnormal ones. It is probable that the dotted line taken in connection with the right hand portion of the curve would more nearly correspond to



normal. This curve would have a median in the neighborhood of 100. This curve represents the combined figures from all the spermatozoa counts noted in Table I.

We come now to what is the most important and at the same time the most difficult part of such a statistical study of cases as we are dealing with in this paper, namely, a consideration of the actual results which have been obtained. It is here that there is the greatest chance for error to creep in, or for the bias of the one who is reporting the statistics to affect the net result. It is the belief of the writer of

this paper that anyone making such a report of his personal successes and failures, particularly where the subject is one of sterility, should make it absolutely clear just what he is reporting as a success and whether there has been any selection used in regard to the statistics on which the percentage of success is calculated.

In this paper all successes which have followed treatment are classified according to whether the pregnancy went through to full term, whether it ended in a miscarriage in which there was absolute proof that a pregnancy had taken place through the finding of a fetus or positive evidence of pregnancy through microscopic examination, or whether there was a blighted ovum in which case both patient and doctor had every reason to believe that pregnancy occurred but where there was no microscopic evidence. In this paper also the crude statistics are quoted first and any corrections which have been made are plainly indicated so that there can be no misconstruction whatever.

Out of the 1070 cases there were 208 full-term pregnancies (Table III), 28 miscarriages and 11 blighted ova, making a total of 247 pregnancies or 23.1 per cent. For full-term pregnancies the percentage is 19.4 per cent. These are the crude statistics, but they obviously give an incorrect expression of the facts even without any selection of cases whatever. The chief reason for this lies in the fact that it always takes a considerable period of time after treatment has been instituted before there can be any hope for a pregnancy. For instance, our records show that the greatest number of pregnancies following abdominal operations do not occur until about a year afterward on the average. The time is somewhat less after an operation where the abdomen does not have to be opened but is still a good many months, and even office treatment on account of various delays and in the very nature of the case takes time. For that reason without any selection whatever of the cases it seems fairer in calculating percentage of success to omit all the cases seen in the past year and to omit from the successes all those which may have occurred during that year on those particular cases. This automatically reduces the total number of cases to 960 and at the same time the full-term successes by 7 to 201, the miscarriages by 1 to 27, and the blighted ova not at all. To repeat, then, leaving out the cases seen in the last year from April 1, 1927, to April 1, 1928, there was a total of 960 cases with 201 full-term pregnancies resulting, giving a percentage of 20.9 or of 24.9 if miscarriages and blighted ova are included as well. These figures, it will be understood, are completely unselected; they merely cover the cases seen up to April 1, 1927, with all pregnancies which are known to have occurred in them up to April 1, 1928.

So much for the figures without selection, but it does not seem unreasonable to make certain selection because of the nature of the cases from which the figures have been taken. In the first place up to

April 1, 1927, there were 62 incomplete case records where the examination was never finished and no diagnosis or treatment given. Then there were 41 cases of aspermia previous to that date, and it seems reasonable to exclude these also. There were also 15 women whose age was so much over forty as to make it practically impossible for them to conceive and 1 man over seventy. These 16 cases may therefore also be subtracted. There were 5 cases of severe diabetes and 2 of severe chronic nephritis. These deductions total 126, and when subtraction has been made from the 960, the result is 834. Figured on this group of selected cases the full-term pregnancies amount to 24.1 per cent, and the total 28.8 per cent.

There is a great danger in excluding so-called hopeless cases since there are occasional successes with even the most hopeless appearing. It is obvious from a perusal of Table III, where the successes are grouped by diagnosis and the percentage success figured, that there is a much better chance of relieving some conditions than others. For instance, four-fifths of the cases recorded as simple congestion in which there was a functional disturbance without any pathology whatever eventually had pregnancies, even though reference to Table I shows that some of these cases were married to husbands of low fertility. On the other hand Item 7, closed tubes, shows only about one successful outcome in ten even though a large proportion of the husbands were of high fertility. Most of the other diagnoses have between 20 and 30 per cent successful cases. With the understanding then that any method of hopeless case selection is open to grave objection the following extreme cases may be noted: completely infantile uterus associated with amenorrhea 5 cases, entire degeneration of the ovaries with complete stenosis of the cervical canal and long continued amenorrhea 1 case, carcinoma of the ovary 1 case, extensive fibroids and amenorrhea in a woman over forty 1 case, fibroid uterus necessitating hysterectomy 2 cases. The remaining 22 cases came from Item 7 closed tubes. The condition in each case was proved by operation; double tubercular salpingitis 7 cases; pelvic inflammation involving tubes, ovaries and uterus so extensive that pregnancy was hopeless, and in all of which double salpingectomy had to be performed, 10 cases; 3 cases in which double salpingectomy had already been performed and nothing remained of either tube; 1 case of extensive pelvic inflammation which necessitated hysterectomy; 1 case of carcinoma of the tubes. These cases totaled 32. If they are subtracted from the 834, 802 cases are left with 201 full-term pregnancies, which is 25 per cent, or if the percentage is figured for the total number of pregnancies, including miscarriages and blighted ova, the result is 29.4 per cent.

An examination of the figures shown in Table III, gives an idea, though of course only an approximate one, of the likelihood that there

TABLE III. SUCCESSES BY DIAGNOSIS.

ITEM	DIAGNOSIS	TOTAL NUMBER CASES	PERCENTAGE FULL-TERM PREGNANCIES OF TOTAL CASES	FULL-TERM PREGNANCIES	MISCARRIAGE TUBAL PREG- NANCIES	BLIGHTED OVUM	TOTAL PREGNANCIES
1	Cervix, laceration	33	33.3	11	0	1	12
2	Cervix, antelexion	88	19.2	17	0	0	17
3	Cervix, endocervicitis	55	29.0	16	1	2	19
4	Uterus, underdeveloped, dou- ble and endometritis	51	15.7	8	0	1	9
5	Uterus, fibroids	56	17.9	10	5	0	15
6	Uterus, retroversion	138	23.9	33	1	1	35
7	Tubes, closed	144	7.6	11	4	0	15
8	Ovaries, cystic	97	26.8	26	4	3	33
9	Congestion	44	75.0	33	3	0	36
10	Age	15	0.0	0	0	0	0
11	Obesity	52	19.2	10	5	3	18
12	Underweight	10	40.0	4	0	0	4
13	Anemia	16	12.5	2	0	0	2
14	Miscellaneous	6	0.0	0	0	0	0
15	a to i male	197	13.7	27	5	0	32
16	Incomplete	68	0.0	0	0	0	0
TOTALS		1070	19.4	208	28	11	247

is with our present knowledge of correcting the various conditions listed under diagnosis. As was stated in the preceding paragraph when hopeless, incomplete and absolutely sterile cases are deducted there was an average of 25 per cent of full-term pregnancies. The conditions in which the chance for success is greater than this expected average are Item 1, lacerated cervix; Item 3, endocervicitis; Item 8, cystic ovaries; Item 9, simple congestion; and Item 12, underweight. The following conditions are below the average but relatively close to it: Item 2, anteversion; Item 6, retroversion; and Item 11, obesity. All the rest are much below with Item 7, closed tubes, the worst of all. The three items 10, age, 14, miscellaneous, and 24, incomplete, are zero but have been excluded as noted above. Item 13, anemia, is undoubtedly too low due to the manner of case selection, also items 15 to 23, the male cases, appear too low since they include the 44 cases of aspermia. If these are deducted in figuring the percentage of success, the total is 153, and the percentage of full-term pregnancies is 17.6, which corresponds better with the facts.

In calculating percentages no deduction has been made for the fact that many of the husbands were of distinctly poor fertility. Only the aspermias have been deducted as noted. A very good idea of the character of the fertility of the husbands of those patients listed as items 1 to 14 inclusive in Table I can be obtained by totaling the figures for male fertility which appear opposite these respective items. As has been elsewhere explained, these fertilities are derived from consecutive spermatozoa counts on recent cases. The spermatozoa counts which appear under the male diagnoses Item 15 *a* to *i* are excluded because of the preponderance of low counts due to the nature of the method of selection. Making the totals then as indicated there are 22 where the sperm count is less than 25,000,000 per c.e., 61 where it is between 25,000,000 and 50,000,000 per c.e., 76 between 50,000,000 and 75,000,000 per c.e., and 110 where the count is 75,000,000 to 100,000,000 or more. There are 269 of these counts which would seem to be a fair sample. Reducing the figures noted above to a percentage basis we find that 8.1 per cent of the husbands were very poor, 22.7 per cent were poor, 28.3 per cent fair and 40.9 per cent good. These facts must be taken into account in figuring percentage success, but since the numbers are relatively small no deductions have been made. One can, however, safely say in examining any of the figures shown in Table III in items 1 to 14 that if the cases with husbands whose semen was poor had been eliminated the percentage of success would probably have been 20 to 25 per cent greater. The writer believes, however, that for statistical purposes this is a rather dangerous means of calculating results. Not infrequently a single examination of semen will for one reason or another appear very much poorer than it would some other time; then, too, there are so many unknown factors relat-

ing to fertility that to choose a single one to the exclusion of all others is liable to lead to considerable errors.

In the same way the habit of certain writers in reporting their results of excluding cases which did not remain under their personal care is a very dangerous one since it immediately handpicks the statistics. It is very easy to get a high percentage of success by eliminating all the hopeless cases and treating only those where there was a relatively great chance to effect a cure. Even to limit cases to those seen more than once or twice will give a marked bias to the statistics since many such cases are given advice and proceed to follow it though perhaps not under the immediate care of the physician who gives it. It is in fact extremely difficult to gauge the relative efficacy of different forms of treatment since so many cases can be eliminated on the ground that the treatment advised was not followed.

In concluding this presentation of the results of treatment I wish to call attention to Table IV which gives the results of other writers as far as they have been published. It is possible that there have been other articles on results, but if so they have not come to the attention of the writer. Polak⁵ Hunner and Wharton¹⁰ and Dickinson and Cary¹¹ have reported their results in considerable detail. The last article quotes a number of figures without references stating the results of the curability of certain particular causes of sterility by certain writers. These, however, are so heterogeneous and so entirely unsubstantiated by total figures as to be quite worthless. The table therefore is confined to the three series already mentioned.

TABLE IV. TABULAR PRESENTATION OF PUBLISHED RESULTS OF THE TREATMENT OF STERILITY

AUTHOR	TOTAL CASES	TOTAL PREG- NANCIES	PER CENT SUC- CESSES	FULL-TERM PREG- NANCIES	PER CENT SUC- CESSES
<i>Unselected Cases</i>					
Polak, 1916	798	134	16.8	Not stated	
Hunner and Wharton, 1924	526	91	17.3	81	15.4
Dickinson and Cary, 1927	788	Not stated			
Macomber and Reynolds, 1928	1070	247	23.1	208	19.4
<i>Selected Cases (from the above)</i>					
Polak	427	134	31.1	Not stated	
Hunner and Wharton	363	91	25.0	81	22.3
Dickinson and Cary	73	34	46.0	Not stated	
Macomber and Reynolds	802	239	29.4	201	25.0

The table is divided into two parts according to whether selected cases are used as a basis for calculating the basis of success or not. The percentage calculations are not quotations but were made by the writer from the figures as given in the articles. The basis for selection as given in the second part of Table IV was for Polak's⁵ cases the exclusion of 231 cases because the records were incomplete or the

patients failed to return; the exclusion of 64 because of impotence, aspermia, deformed and sluggish spermatozoa, or uncured infection; the further exclusion of 70 women with such gross pelvic pathology as to make pregnancy impossible, and of 6 women with such severe heart disease or diabetes as to render pregnancy inadvisable. The deductions then totaled 371, leaving only 427 out of the total 798 (53.5 per cent) on which to reckon the per cent of successes. Such a drastic culling of cases would seem to give too high a percentage of cures.

Hunner and Wharton¹⁰ are a little ambiguous as to the total pregnancies quoted in the first section. They say that there were 110 pregnancies, but since these were apparently only in 91 patients the latter figure is used. Their method of selection is not entirely clear. They state that 363 cases were treated and 163 eliminated; of this 163, 56 were discarded because the male was sterile, 13 of the women were found to be normal and therefore were not treated, 9 required radical surgery and 56 more would not accept treatment. However, these deductions, peculiar as some of them seem (particularly the excluding of normal women), still leave 29 the reason for whose elimination is not given.

Dickinson and Cary¹¹ state that their statistics are based on the last 300 of 788 cases. They do not, however, state how many of those 300 conceived, but limit their report of successes to those 73 in the practice of one of them who persisted in treatment under his care after a diagnosis had been made. In this admittedly very much restricted group they report 34 or 46 per cent success. Such a method of stating their results would seem rather arbitrary to say the least.

Finally in Table IV there are added the results of the study which has been presented in this paper showing both the unselected statistics and those in which some degree of selection was employed. In presenting them and in concluding this paper the author does not wish in any sense to claim any superior method of diagnosis or treatment, or to set his results against those of any other worker in this field. The results at best are discouraging when considered only from the point of view of percentage success. Such a study is useful only when used to point the way toward greater achievement. It is even more important if it can be employed to promote a better understanding of the etiology of sterility and to show how it can best be prevented.

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(For discussion, see page 720.)

REACTIONS OF THE PERITONEUM*

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TO GIVE any thought to the title of this discussion is to know that volumes may be written on the subject, as reactions of the peritoneum are intimately concerned in the surgical pathology of nearly all intraabdominal lesions; so we can only take up some of the broader principles of the subject as they may influence our conduct of intraabdominal surgery.

Our studies of the peritoneum have been so closely confined to the pathologic lesions of this structure that we have remained unmindful of the histology and true physiologic function of this membrane; indeed, this is too often our error, we content ourselves with the pathologic picture which confronts us and rarely consider what may have taken place as physiologic reactions before the field became a pathologic one.

This reasoning has been responsible for erroneous surgical conduct in many lesions and is probably most seen in reactions of the peritoneum.

To misjudge the function of any organ poorly prepares one to meet the pathologic lesions of that organ; and furthermore, to unarm an organ by stating that it is without defensive function is to place it immediately in the pathologic column when any reaction is seen, although the same may be physiologic or protective.

For many years we have been taught that the peritoneal cavity was a huge lymph sac and that this sac lining or peritoneum was perforated by numerous small openings called stomata and stigmata whose function was that of absorption. We are much concerned with this so-called lymph sac, in so far as it has had a great deal to do with the surgical pathology of nearly all intraabdominal infectious lesions.

It is necessary here to say a word in regard to the three great protecting membranes, covers or linings of our anatomy, namely, the skin, the peritoneum and the mucous membrane of our gastrointestinal

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and birth canal. To misjudge the function of any one of these great protectors of our body is often to mistake normal function for pathologic involvement.

In our discussion of this subject we can quickly dismiss the skin as one of the protecting membranes of the body in its relation to abdominal surgery with a few words concerning the relation of the skin to the abdominal incision. In our use of the through-and-through suture in closing the abdominal wall, we feel the suture is not apt to become infected because it has two points of contact with protecting membrane, the skin and the peritoneum, and is thus drained at its two extremities; this is exactly what does take place, and one never sees an exploded incision such as takes place in the infected incisions where the terraced suture has been used.

With the terraced suture little concern is necessary with those sutures which come in contact with either the skin or peritoneum, as these membranes will take care of such local infection; but it is the central sutures placed in the muscles and fascia which are not drained by the protecting surfaces, skin and peritoneum, which give the trouble and produce the exploded incisions. This subject is discussed at length in a monograph entitled *Practical Surgery of the Joseph Price Hospital*, and it is not further pertinent here.

Regarding the mucous membrane as one of the protecting surfaces of our body, we are concerned with this membrane in nearly all the intraabdominal lesions and in most of the infections of the birth canal.

We are much interested in our surgical work with the mechanical function of the mucous membrane, for as long as this membrane is intact there is little harmful absorption; but deface or destroy the mucous membrane of the birth canal or bring about destruction of the mucous membrane of the gastrointestinal canal by infection or interfere with its blood supply by thrombus or mass strangulation, then this membrane becomes a great pathologic absorbing surface or permits absorption to take place from those areas from which the membrane has been effaced.

A difference in the reactions of the mucous membrane and the peritoneum must be contrasted. If the mucous membrane is irritated it has little cellular reaction which would be of a protective nature, therefore its function from the standpoint of protection is largely mechanical. This brings out the teaching necessity of great gentleness as a protection to the birth canal.

When we come to discuss the function of the third membrane or peritoneum, we find that this great surface, nearly that of the entire skin area of the body, not only has a mechanical protecting function but also has a decided cellular reaction which is physiologically protective to a profound degree.

Therefore, in summing up it may be said of these three great membranes, the skin, mucous membrane and peritoneum, that they not only protect our bodies by defining, limiting and repelling infectious agents, but they further define the direction of extension of pathologic lesions, and when taken into account with the great fascial planes which more influence the direction of extension of pathologic fluids through quantity of accumulation, we have an intelligent working basis for most of the surgical lesions of the abdominal cavity and infections of the birth canal.

The peritoneum now most commands our attention. Shall we look upon it as defensive or offensive in dealing with the surgical pathology of intraabdominal lesions?

The popular view today of the surgery of intraabdominal infections is that the function of the peritoneum is offensive and most of the working factors of today's surgery have been established upon that thought and, I feel, very erroneously so. If the peritoneum is to be looked upon as a great absorbing membrane and its reactions to irritation are to increase this absorbing function, then of course its function is offensive, and we can expect little help from its reactions.

I believe we have been wrongfully taught that the peritoneum is a huge lymph sac perforated by numerous openings called stomata which directly connect with the lymphatic system and thus this great area for absorption. This view becomes of practical importance to us who are interested in the surgical pathology of infectious abdominal lesions, as most of the working factors of today's surgical teachings in the peritonitic abdomen have been founded upon this question of peritoneal absorption.

Histologic and physiologic studies have quite convinced laboratory investigators that the numerous stomata which are supposed to exist as the beginnings of lymphatic vessels do not in reality exist and further that the lymphatic vessels are not directly connected with the free surface of the peritoneum and in this sense are not the true absorbing vessels of the peritoneum.

This of course is flying in the face of what has been taught for the past fifteen or more years in regard to the treatment of the peritonitic abdomen. Not only has it been the teaching that the lymphatic vessels were the true absorbents of the abdominal cavity, but teachers have gone so far as to contend certain locations of the abdominal cavity were richer in these lymphatic absorbents than other regions. This teaching brought forth the Fowler position as it was contended that the lymphatics of the upper abdominal cavity were more numerous than in the lower, so the patient was placed in the Fowler position in order that infectious fluids would gravitate toward the pelvis where absorbing lymphatic vessels were not so numerous.

In a publication in 1910 we took the position that the final and fatal dose of toxins in the peritonitic abdomen did not come from the peritonitis per se, that a very little absorption took place from the peritonitic peritoneum and furthermore that lymphatic absorption had little to do with the final end of the peritonitic patient, that there was little if any difference between the upper and lower abdominal absorption, that we did not endorse the Fowler position not only on account of the above discussion but that the Fowler position did not give the most dependent point for drainage and that such position brought strain upon the heart and therefore we favored the right Sims position placing the patient in the attitude of flexion and rest in all drainage peritonitic conditions.

In regard to possible regions of maximum lymphatic absorption in the abdominal cavity, Dr. Hertzler in his most instructive work on the peritoneum says, "There is no more classical example of reasoning on false premises than that concerned with the supposed local site of maximum absorption from the peritoneum." Here are the words of a brilliant teacher of wide experience who has been an anatomist, a pathologist and a clinical teacher in surgery.

My work has not been in the laboratory, but my clinical experience made me endorse the teaching outlined in 1910, and I am grateful to those laboratory authorities who now permit me to stand by my guns.

It has been fairly well proved that the lymphatic vessels are not the true abdominal absorbents and that such absorption takes place through the blood vessels. If the lymphatic vessels were the true abdominal absorbents, why are the lymphatic glands not always involved in the acute peritonitic lesions? They are not. The lymphatic vessels are more apt to be involved in retroperitoneal conditions and in those more chronic lesions of the mucous membrane. This is quite in accord with the teaching that the lymphatic vessels do not have their beginning in the free surface of the peritoneum.

We take the position that the true function of the peritoneum is not offensive but defensive, and therefore its reactions to irritants is protective. Before we can discuss this view of the peritoneum we must place it within the abdomen as an organ with a true function, as have the liver and kidney. We have been too prone to think of the peritoneum as a great sheet or lining of the abdominal cavity and its contents and that about the only function it had was that of a suspensory ligament to the abdominal organs, whereas it is doubtful if the peritoneum has any suspensory function as a ligament.

Many interesting experiments have been made to show that the lymphatic vessels are not the true absorbents of abdominal fluids, for instance, examination of the peritoneal fluid shows no resemblance to contents of the lymphatic vessels. After the lymphatic vessels were tied, there was no diminution in rate of absorption of serum. Only

those factors which increase metabolism augment production of lymph; this only goes to show that the content of the lymphatic vessels is not a product of filtration but a cellular function. Substances placed within the abdominal cavity will appear in the urine before they are seen in the lymphatic vessels, showing that the true blood vessels are the real abdominal absorbents.

I have gone to some length into this function of the peritoneum in its relation to the lymphatic system because it has had much to do with the treatment of the infected peritoneum; indeed most of the working factors of today's teaching in the peritonitic abdomen have emanated from what we assume to be a false or mistaken idea of the function of the peritoneum and lymphatic system.

There is every reason to feel that the blood vessels and not the lymphatic vessels have most to do with the reactions of the peritoneum. The part played by the blood vessels in inflammation is well known, and it has been pointed out that the peritoneum has two sets of blood vessels, namely, service and potential. The service vessels are the conspicuous ones with which the student of anatomy is familiar; the potential vessels are those which come into immediate contact with the peritoneum and are only seen as active vessels when the peritoneum is irritated. We thus have an abundant blood supply to the peritoneum which seems to have an extra vascular system provided for emergencies, such as irritation or inflammation, and this again goes to indicate that the function of the peritoneum is defensive.

I have never endorsed the teaching that there were a number of openings leading from the abdominal cavity through the diaphragm; such communications were supposed to be responsible for infections conveyed from the abdominal cavity and the cause of collections of pus above the diaphragm. This reasoning has always seemed to me to be academic, and it is refreshing to find that investigations have shown that no such openings exist.

There is always a logical sequence to the behavior of infection, and when we are able to trace blood vessel and lymphatic connections, we find an anatomic road which has been the means of conveyance of infection. Our own ignorance is responsible for most of the supposed physiologic and anatomic defects in nature.

It is upon this question of peritoneal absorption of infection that the present day surgical teaching in peritonitis has been established, which has as some of its working factors the Fowler position, the source of the infection may or may not be removed, adhesions are not supposed to be broken under any circumstances, the active stage of the complicating peritonitis is not to be subjected to radical surgery, the patient is to be put upon the watchful waiting list for subsidence of active symptoms, during which time the Fowler position and saline solution by the bowel is the only treatment.

These working factors have been based upon antiperitoneal absorption and stand upon this one fragile leg of peritoneal absorption, even though so much has been done to show that the function of the peritoneum is defensive, and further, that the peritonitic peritoneum is not an absorbing membrane, for when exudate appears upon the peritoneum absorption ceases. We take the position that peritonitis is not forbidding but inviting, and were it not for the bowel obstruction, distal abscess and retroperitoneal absorption which accompanies the distended peritonitic abdomen, the peritonitis would more often win than lose the fight.

We assume the distended abdomen is not a symptom but a condition and invites active and immediate surgery in order to cope with the partial or complete bowel obstruction which is most often the cause of the final and fatal dose of toxins in the peritonitic patient and not the peritonitis per se.

The sacred adhesions of the present day teaching we contend are a part of the pathologic condition and must be dealt with in order to reach the bowel obstruction, distal abscess, etc.

We take the ground that the reactions of the peritoneum are defensive and therefore permit radical surgery, evisceration, etc., whereas the watchful waiting or physiologic surgeon assumes that the reactions of the peritoneum are offensive and permits no manipulation in the peritonitic state on account of fear of increasing peritoneal absorption.

We contend there is little if any absorption taking place from the already peritonitic peritoneum and that the peritonitic peritoneum will stand manipulation with less degree of shock than the normal peritoneum, never having seen a case of typical shock from a peritonitic patient. Distinction must here be made between operative depression and typical shock which comes on with suddenness and gravity some hours after operation.

Just as the peritonitic peritoneum has had the absorbents blocked, so has its sensitivity been dulled by the infection and is not as receptive as would be the normal peritoneum and therefore permits and welcomes radical surgery gently done.

That the reactions of the peritoneum are defensive or physiologic can be seen in the protective influence of the fluid which is very early thrown out in the acute lesions of the abdomen. This muddy fluid is probably sterile for some time and is sufficiently chemically irritant to produce a hyperemia of the peritoneum, this reaction being the earliest stage of peritoneal protection and the advance guard sent out against a threatened peritonitis. Such conditions when seen with a gangrenous appendix may be closed with brilliant results, and fewer untoward symptoms will follow than in removal of the ordinary clean appendix; the peritoneum had been prepared for the surgeon's hand, an evidence of reactive protection on the part of the peritoneum.

In considering the question of peritoneal absorption the chemical nature of the fluid must be taken into account. Inflammatory exudates with which we deal in the peritonitic abdomen are of an albuminous nature and therefore not as early absorbed by even a normal peritoneum as crystalline substances would be and little if at all absorbed by the peritonitic peritoneum.

We are not unmindful of the fact that overwhelming doses of toxins may be very rapidly taken up by the peritoneum before there is sufficient reaction on the part of the peritoneum to prevent absorption and prove fatal before a true peritonitis exists. This again argues for the defensive power of the peritonitic peritoneum.

During the surgical conduct of peritonitic lesions there are many evidences that the apparent severity of the peritonitis cannot be taken as a measure of the degree of infection; indeed the reverse is so.

In those cases where there has been evidence of a severe peritoneal reaction shown by the amount of exudate thrown out over an extensive area of peritoneum, we find the death-rate lower than where there has been little reaction of the peritoneum. These we call the dry cases, which simply means the type of infection is not a peritonitis, is a true retroperitoneal infection and is accompanied by a high mortality; this postulates that the peritoneum cannot be held culpable for all the intraabdominal toxemia.

The infection from the perforated retrocecal appendix is the most often fatal of all types of the perforated appendix, the patient often succumbing without evidence of a peritonitis and passes out with a flat abdomen and soluble bowel.

All forms of puerperal infections are accompanied by a very high mortality, and yet this condition cannot be classed as a true peritonitis but must be classed as a wound infection and involves the abdominal structures as a true retroperitoneal infection.

When infections extend to the abdominal viscera as retroperitoneal lesions and thus little influenced by the peritoneum, the mortality is high, which again bespeaks the protective influence of the peritoneum. We are trying to bring out the point that we are not justified in doing the incomplete work in the peritonitic abdomen, which is today's teaching, on account of fear of increasing peritoneal absorption when there are other more dangerous sources of toxemia; and especially is this so when there are numerous evidences to show that very little absorption takes place from the peritonitic peritoneum.

We make no contention that there is not a certain amount of absorption taking place in the peritoneum by way of the blood vessels, but we certainly question the right of the surgeon to ignore all other avenues of intoxication in the peritonitic abdomen in order that the peritonitic peritoneum must not be molested by surgical manipulation.

As we see it, the main point of contention between the operator who assumes that the function of the peritoneum is offensive as an absorbing membrane is that such teaching is only taking into account a superficial surface or the peritoneal lining of the abdominal cavity as a single source from which toxemia is to be combated; whereas, the operator who assumes that the reactions of the peritoneum are defensive takes the position that the peritonitic abdomen must be viewed with the idea of possible sources of infection throughout the continuity of the mass structure. In other words one operator has in mind surface topography, the other that the peritonitic peritoneum is a mountain of pathology which must be dealt with throughout the continuity of structure.

We take the view that it is not the peritonitis for which we operate but the complications of the peritonitis, namely, partial or complete bowel obstructions, proximal and distal abscesses, retroperitoneal infections, etc., the bowel obstructions probably being a cause of the final and fatal dose of toxins. This is the position we take in dealing with the peritonitic abdomen, this is our view of the surgical pathology of the peritonitic patient and can only be accomplished by breaking all adhesions and eviscerating all peritonitic structures as far as this may be possible; this is drainage, and it must be remembered that the very foundation in the treatment of the peritonitic abdomen is drainage. The incision into the abdomen is drainage, each adhesion broken is drainage, each infected structure removed is drainage, every partial or complete bowel obstruction released is double drainage, each abscess released is drainage, each structure released from a fixed dependent point and elevated is drainage, and the very foundation of drainage is removal of the distal infecting source.

All of these steps toward the accomplishment of proper drainage bring about release of intraabdominal tension which lessens intraabdominal absorption. So it must be seen that we cannot dismiss the great subject of drainage of the peritonitic abdomen by simply talking about a glass or rubber tube or a piece of gauze; nor can we dismiss the subject of drainage without taking into consideration the mucous membrane of the gastrointestinal canal, which after all is most to be considered in the distended abdomen; nor can we drain the peritonitic abdomen without release of the bowel obstruction and thus drain the mucous membrane of such infected canal.

It is our opinion such toilet cannot be done unless a proper cofferdam of gauze is used.

Tubal drainage is relatively worthless in these extensive lesions. It is the mechanical function of the properly inserted cofferdam of gauze which gives it its matchless life saving function.

This system of cofferdam drainage keeps the intestine elevated, which improves its circulation and prevents the bowel prolapsing into

the dependent and infected area, here to be reinfected and cause the postoperative bowel obstruction.

Irrespective of any actual amount of drainage the gauze may occasion, its mechanical function stamps it the superior means of drainage for combating these cases.

I had no intention of taking up even an incomplete discussion of the surgical pathology of this subject but have done so on account of the marked increase in death-rate during the past fifteen years in the peritonitic cases following the perforated appendix, which, I feel, is due to the incomplete toilet and the classification of the peritonitic patient into operative and nonoperative stages.

The failure to comprehend the true surgical pathology of the peritonitic peritoneum has brought forth those surgical steps which deal only with a superficial membrane, the peritoneum, as the cause of the fatal outcome of the peritonitic patient, when in reality it is only one of several sources of toxemia and probably the least cause of the fatal outcome of the peritonitic patient.

This subject is gone into at length in the monograph earlier referred to in this publication.

The present conduct of the peritonitic patient is challenged by the marked increase in death-rate for the past fifteen years.

In England and Wales the mortality in the acute appendicitis lesions has increased 7.3 per cent estimating on forty millions of people, in America 22.3 per cent estimating on eighty-seven millions of people, in Philadelphia 18 per cent.

Today's teaching in active peritonitis which has as factors incomplete surgery and watchful waiting for quiescence of acute symptoms, will always give a high death-rate, multiple operations on the same patient and postoperative complications so numerous as to condemn the primary procedure as unsurgical in every particular.

On account of the extraordinary rapidity with which repair takes place, the study of wound healing as seen on the peritoneal surface is one of the strongest arguments for the defensive function of this membrane; in a few minutes fibrin has formed and healing has begun.

This function of the peritoneum demonstrated by its ability to repair so rapidly its abraded surface and that function also shown by the celerity with which it surrounds foreign bodies that have been introduced into the abdominal cavity, should further teach us how very local and how very quickly local are all forms of drainage of the abdominal cavity.

When the profession teaches that the reactions of the peritoneum are defensive and not offensive, I feel then that the surgical pathology of peritonitis will be placed upon a true basis.

It is my opinion the history of the surgical pathology of peritonitis will have to be rewritten.

THE USE OF MERCUROCHROME AS A VAGINAL ANTISEPTIC BEFORE CESAREAN SECTION

REPORT OF 338 CASES AT THE METHODIST EPISCOPAL HOSPITAL*

BY HARRY W. MAYES, A.M., M.D., BROOKLYN, N. Y.

CESAREAN section, properly employed, has unquestionably saved the lives of many infants. Moreover, the higher morbidity and mortality attending this procedure are due in part to conditions for which the operation itself should not be blamed.

In a collective review of 1,805 cesarean sections performed in various hospitals of Brooklyn, Gordon¹ found the average maternal mortality to be 7 per cent. In 1,015 classical cesarean sections in which the records were complete, the mortality was 5.9 per cent; the deaths due to puerperal sepsis, 2.4 per cent. In 187 low cesarean sections, the total mortality was 4.2 per cent and that due to sepsis 2.4 per cent.

Reviewing a large series of cases from the British Isles, Holland² reported a maternal mortality of 7.5 per cent in 1,953 classical cesarean sections. The mortality due to infection alone was 4 per cent. In 1,142 low cesarean sections, the mortality was 4.1 per cent.

From the figures quoted in the two preceding paragraphs, it would appear that puerperal infection accounts for almost one-half of all the deaths following cesarean section.

Harris and Brown³ took cultures from fifty uteri at cesarean section and found twenty-two to be infected. All but one of the patients with infected uteri had fever during the puerperium. Also, in all of twenty-one patients in whom active labor had lasted six hours or over, the lower uterine segment was found infected.

Following the mercurochrome technic, I took uterine cultures in eleven cases at cesarean section, in none of which a pathogenic organism was grown. Seven cultures taken from the maternal surface of the part of the membranes corresponding to the cervix also proved negative.

The high incidence of infection in association with cesarean section suggested the use of mercurochrome as a vaginal antiseptic before the operation. If it were possible to destroy or inhibit the bacteria in the vagina at the onset of labor and prevent subsequent contamination arising from vaginal examinations and the use of instruments, the danger to the mother would be materially lessened and the obstetrician would have less hesitation in resorting to cesarean section, when indicated to save the life of the child.

Elsewhere I⁴ have shown that the use of mercurochrome in obstetrics compares favorably with iodine preparation and reduces maternal

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morbidity; that⁵ the use of a 4 per cent solution of mercurochrome as a vaginal antiseptic during labor and delivery reduces the morbidity from childbirth 50 per cent; that⁶ combined external preparation with mercurochrome and the use of this drug as a vaginal antiseptic effectively reduces puerperal morbidity; and that,⁷ when the hydrostatic bag is employed to induce labor, the use of mercurochrome may reduce the morbidity from 29 to 11.5 per cent.

During the last four years the mercurochrome technic was used in over six thousand deliveries at the Methodist Episcopal Hospital with a gratifying fall in the morbidity rates. During the last year the morbidity rate was only 40 per cent of what it was before mercurochrome was employed as a routine. And I am convinced that, were it not for

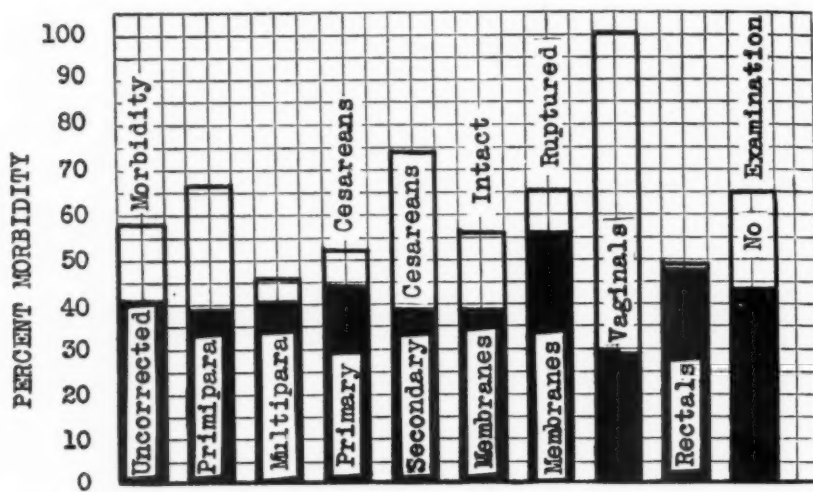


Fig. 1.—Chart showing a comparison of the morbidity with and without mercurochrome. The shaded area represents the mercurochrome series and the area outlined the morbidity without mercurochrome.

the routine use of mercurochrome during labor and at the time of delivery, our maternal morbidity now would be just as high as in previous years.

CESAREAN SECTIONS WITH AND WITHOUT MERCUROCHROME

Having in mind the value of mercurochrome in reducing maternal morbidity from infection both in normal labor and dystocia, I decided to compare results in two series of cesarean sections, in one of which mercurochrome preparation was employed as a routine and in the other of which it was not.

The series in which mercurochrome was employed as a vaginal antiseptic included 218 cesarean sections. Ninety-two, or 42.2 per cent, of these patients had a morbidity during the puerperium. The total number of days of morbidity was 541, representing an average of 2.5 days for each patient of the entire series.

One hundred twenty mothers were delivered by cesarean section without mereurochrome. Sixty-nine, or 57.5 per cent, of them had a morbidity during the puerperium. Their total number of days of morbidity was 456, or an average of 3.8 days for each patient of the entire series.

Apparently, the vaginal instillation of mereurochrome reduced the morbidity by 15.3 per cent and the average number of days for each patient by 1.3 days.

Analyzing the morbidity in the mereurochrome series, we find that puerperal morbidity was due in twenty-three cases to causes outside of delivery: respiratory complications, 10; breast complications, 2; phlebitis, 2; pyelitis, 2; toxemia, 2; colitis, 1; cystitis, 1; axillary abscess, 1; parotitis, 1; and appendicitis, 1. This gives a corrected morbidity of 31.7 per cent. The morbidity was accounted for by eleven cases in which the temperature curve suggested a reaction from the operation, nine cases of lochimetra, eight of wound infection, four of

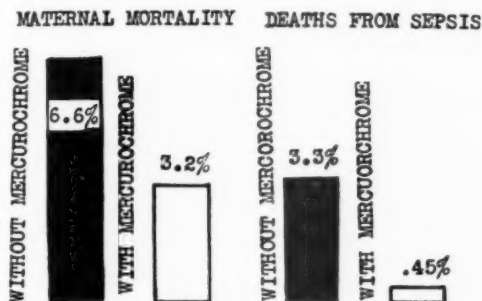


Fig. 2.—Chart showing a comparison of the maternal mortality and of the deaths from sepsis, with and without the mereurochrome technic.

endometritis, one of peritonitis, and thirty-six cases in which either the cause or the morbidity was not determined or no record was made on the clinical chart.

In eighty-three cases of disproportion with the use of mereurochrome, the morbidity was 45 per cent, as against a morbidity of 61 per cent in a corresponding series without mereurochrome. Also, in twenty-one cases of toxemia with the use of mereurochrome, the morbidity was 47 per cent, as against 64 per cent in twenty-five cases without mereurochrome.

COMPARATIVE MORTALITY STATISTICS

In the series with mereurochrome there were seven maternal deaths, a mortality of 3.2 per cent. In the series without mereurochrome there were eight maternal deaths, a mortality of 6.7 per cent. Also, one death (0.5 per cent) was due to infection in the series with mereurochrome, as against four deaths (3.3 per cent) in the series without mereurochrome.

The mortality rate was more than twice as high and the death rate due to sepsis almost seven times as high, when mereurochrome was not used as a vaginal antiseptic.

The patient who died from sepsis in spite of the use of mereurochrome was a primipara with unruptured membranes, who had been in labor a long time and passed into shock during the anesthesia. She bled profusely during the operation and later developed generalized peritonitis. As she took the anesthetic very poorly, I believe that she might have been saved if a local anesthetic had been used.

The remaining six deaths in the mereurochrome series were due to the following causes: acute cardiac dilatation, 2; pulmonary embolism, 2; cerebral hemorrhage, 1; and pneumonia, 1. These are conditions that may follow any operation regardless of the factor of infection.

In the series without mereurochrome four of the deaths were definitely due to puerperal sepsis. In two other fatal cases the mothers ran a high temperature and were probably infected, although death was ascribed to toxemia in one case and to acute cardiac dilatation in the other.

PRIMARY VERSUS SECONDARY CESAREAN SECTIONS

Without mereurochrome, there was a greater morbidity from secondary cesarean sections; while, with mereurochrome, the morbidity was greater from primary cesarean sections. In the series without mereurochrome, the morbidity was 52.7 per cent from primary and 74.1 per cent from secondary cesarean sections. In the series with mereurochrome, it was 44 per cent from primary and 39.3 per cent from secondary cesarean sections. The lower morbidity rate in the secondary cesarean cases may be accounted for by the fact that they have little or no labor.

PRIMIPARAE VERSUS MULTIPARAE

Without mereurochrome, the morbidity was 20.4 per cent greater in primiparae; while, with mereurochrome, the difference was only 2.7 per cent. These results compare favorably with those which I⁷ reported previously with reference to the morbidity following the induction of labor by means of the hydrostatic bag, according to which the morbidity without mereurochrome was almost twice as great in primiparae but almost the same in primiparae and multiparae when mereurochrome was used.

VAGINAL VERSUS RECTAL EXAMINATIONS

Ever since the memorable paper on the contagiousness of puerperal fever by Oliver Wendell Holmes in 1843, vaginal examinations have been blamed for the majority of infections following childbirth. Today the consensus of opinion is that patients who have been examined by a midwife or physician prior to admission to a hospital may be considered as potentially infected.

Gordon¹ found that in 227 cases of classical cesarean section in which there had been vaginal examinations the mortality was 12.3 per cent, and in seventy cases in which there had been vaginal examinations before low cesarean sections it was 11.4 per cent. Compare these results with those of the mercurochrome series, in which fifty-four of the 218 patients, or 25 per cent, had vaginal examinations; yet the mortality was only 5.3 per cent.

In five cases in which vaginal examinations were made without mercurochrome preparation, there was a morbidity of 100 per cent and one death from sepsis. In seventy-one cases in which examinations were made by rectum instead of by the vagina, the morbidity was 49.3 per cent and there was one death from sepsis.

In fifty-four cases in which vaginal examinations were made with mercurochrome preparation there was a morbidity of 29.6 per cent and

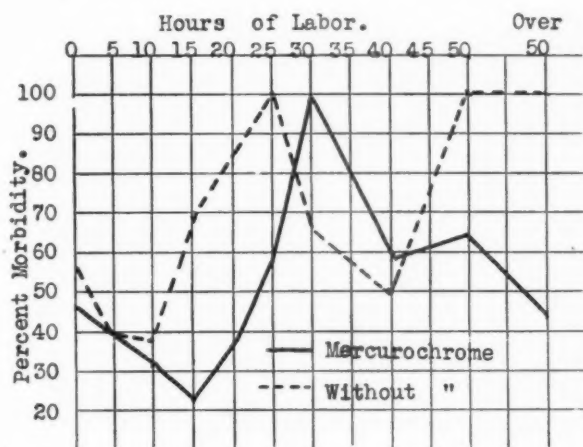


Fig. 3.—Effect of the duration of labor on the morbidity.*

one death from sepsis. In ninety-eight cases in which examinations were made by rectum instead of by the vagina, the morbidity was 48 per cent. When mercurochrome was used, more vaginal examinations were done and the morbidity was actually 18.4 per cent lower than when rectal examinations alone was employed. I believe that the lower morbidity in the group in which vaginal examinations were done was due to the fact that, when the examination was performed, mercurochrome was instilled again and brought by the manipulation into more intimate contact with the vaginal and cervical mucosa.

EFFECT OF RUPTURED MEMBRANES

Ruptured membranes caused a considerable increase in the morbidity in both series. When the membranes were intact, the morbidity

*Thirty-six of the patients in the mercurochrome series had a period of labor of over thirty hours with a morbidity of 64 per cent, while in the nonmercurochrome group there were only seven cases of labor over thirty hours and the morbidity was 85 per cent.

was 37.1 per cent with and 55.6 per cent without mercurochrome. When they were ruptured, it was 56 per cent with and 65.4 per cent without mercurochrome. Thus in the mercurochrome series the morbidity was 18.5 per cent lower when the membranes were intact and 9.4 per cent lower when they were ruptured than in the series without mercurochrome. Also, there were two deaths in the cases of ruptured membranes without mercurochrome and none in those with mercurochrome.

EFFECT OF DURATION OF LABOR ON MORBIDITY

Without mercurochrome there was a drop in the morbidity during the first five hours of labor below that in the cases with no labor. When labor was allowed to progress over ten hours, the morbidity rate rose rapidly, averaging 85 per cent for all patients in labor over fifteen hours.

With mercurochrome there was a steady fall in the morbidity below that in the cases with no labor until a period of fifteen hours was reached, after which there was a rise in the morbidity, which averaged 55.9 per cent for all patients in labor over fifteen hours.

In patients who had no labor the morbidity was 46.3 per cent with and 56.6 per cent without mercurochrome. There were no deaths from sepsis when mercurochrome was used but two septic deaths when mercurochrome was not used. The relatively high morbidity in the mercurochrome series without labor was probably due to the fact that the mercurochrome was improperly instilled or the operation followed the instillation too closely.

WOUND HEALING

The abdominal wound was infected in 12.5 per cent of the cases without mercurochrome, and these patients had a morbidity of 86 per cent. When mercurochrome was used, only 8.2 per cent of the wounds were infected and the morbidity was 65 per cent in these cases.

LOW CESAREAN SECTIONS

In the mercurochrome series there were twelve low cesarean sections, with a morbidity of 41.6 per cent and a mortality of 8.3 per cent. They were all primary. In six the membranes were ruptured, and in five vaginal examinations had been done. The average duration of labor for the twelve cases was thirty-three hours. One patient had had no labor.

Stein and Leventhal⁸ in 1928 reported forty laparotrachelotomies without a death in which they instilled 1 ounce of mercurochrome solution into the vagina before operation.

On the Second Obstetric Service, in charge of Dr. Ralph M. Beach, we have had eighty-six cesarean sections since the adoption of the mercurochrome technic as a routine at the Methodist Episcopal Hospital.

The morbidity was 37.7 per cent and there have been two deaths, a mortality of 2.3 per cent. All of these cesarean operations were of the classical type. In fact, we have never done a low cesarean section on the Second Obstetric Service.

When no effort is made to sterilize the birth canal before operation, there is no doubt that low cesarean section is of definite advantage; but, with the use of mereurochrome, the danger of infection is almost nil and there is no advantage in substituting a more difficult operation for the classic cesarean.

TECHNIC

Following careful perineal preparation, if the patient is in labor, the external genitalia and surrounding area are sprayed with a 4 per cent solution of mereurochrome and 3 drams of the same solution are instilled into the vagina by means of a special Asepto^{*} syringe. The point of the syringe is blunt, so as to cause no injury, and the opening at the end is so small as to avoid leakage.

The tip of the syringe should be passed along the vaginal floor and the barrel held close to the pubes. When the syringe is inserted, the labia should be held close together to allow the fluid to enter the vagina under slight pressure. During labor, the instillation should be repeated every twelve hours and, if a cesarean section is contemplated, again one hour before the operation. In elective cesarean sections, when the patient is not in labor, I prefer to give two instillations one or more hours apart, preferably one on the night before and one on the morning of the operation.

In the preparation at the time of a vaginal delivery, the perineum is cleansed with a moist, sterile towel and the external genitalia and surrounding field sprayed with a 4 per cent acetone, alcohol, aqueous solution of mereurochrome. Then the pelvic floor is depressed and 2 drams of the mereurochrome solution are poured into the vagina. If the operation is prolonged, the field becomes soiled, or a laceration or an epistiotomy must be repaired, more mereurochrome should be used. If the patient has been in labor for some time and the mereurochrome technic has been used, I believe that she is not potentially infected even though she has had one or more vaginal examinations.

At the time of the cesarean section, the placenta should be left undisturbed until the uterus contracts down upon it. Contraction is hastened by the administration of 1 c.c. of pituitary extract immediately following delivery. After the placenta has been removed, 1 ounce of 4 per cent mereurochrome solution may be poured into the uterine cavity and allowed to drain through the cervix into the vagina. This procedure has been employed for almost all cases on the Second Obstetric Service, and I believe that it may help to destroy a certain number of bacteria which are left undisturbed by the vaginal instillation. I have observed no ill effects from this technic. When the fascia of the abdominal wound is closed, the wound is swabbed with mereurochrome, care being taken that no excess of the solution is left in the wound. Primary union invariably follows this procedure and the results seem to justify it.

We performed cesarean sections upon two patients following the use of the hydrostatic bag to induce labor. One patient had placenta previa, yet her morbidity lasted only two days. The other had a normal puerperium. In each case the child survived.

^{*}Manufactured by Becton, Dickinson & Co., Rutherford, New Jersey.

One patient had had four vaginal examinations and the membranes had been ruptured for four hours. As an unsuccessful attempt had been made to deliver her by forceps, it was decided not to jeopardize further the life of the child. Accordingly, 2 ounces of a 1 per cent solution of mereurochrome were instilled into the uterus through a catheter passed above the presenting part and a classic cesarean section was performed one hour later. A living child was obtained and the mother had a normal puerperium. My procedure in this case was justified by the fact that bacteria are killed in one hour by a dilution of 1 to 1000 of mereurochrome in the liquor amnii.

On the basis of the cases just cited, the low morbidity rate following induction of labor, and the negative cultures obtained from the uterus at cesarean section, I believe that it might be better when other attempts at delivery prove the presence of disproportion or other abnormal conditions, to do a cesarean section rather than endanger or perhaps sacrifice the life of the child.

SUMMARY AND CONCLUSIONS

1. Two series of cesarean sections were performed at the Methodist Episcopal Hospital: one in which mereurochrome was employed as a vaginal antiseptic and the other in which this procedure was omitted. In 218 cesarean sections with mereurochrome, the morbidity was 42.2 per cent, averaging 2.5 days per patient. The mortality was 3.2 per cent and there was only one death from sepsis. In 120 cesarean sections without mereurochrome, the morbidity was 57.6 per cent, averaging 3.8 days per patient. The mortality was 6.7 per cent and there were four deaths from sepsis.

2. In the group with mereurochrome, five of the seven deaths were due to causes for which the operation itself could not be blamed. In the nonmereurochrome group, only two of the eight deaths were due to causes outside the operation.

3. With mereurochrome, the morbidity was 4.7 per cent greater from primary than from secondary cesarean sections. Without mereurochrome, it was 21.3 per cent greater from secondary sections.

4. The parity of the mother had very little effect on morbidity when mereurochrome was used. Without mereurochrome, the morbidity was 20.4 per cent greater in primiparae.

5. Without mereurochrome, the morbidity following vaginal examination was 100 per cent and there was one septic death. When mereurochrome was used, the morbidity was 18.4 per cent greater following rectal than after vaginal examination.

6. In the mereurochrome series, there were no deaths from infection in the forty-five cases with ruptured membranes. In the twenty-six cases without mereurochrome, there were two septic deaths.

7. Without mereurochrome, the morbidity rose rapidly when labor lasted over ten hours. When mereurochrome was used, the morbidity

did not begin to rise until labor lasted fifteen hours. When labor lasted over fifteen hours, the morbidity without mereurochrome was 85 per cent. With mereurochrome, it was 55.9 per cent.

8. When mereurochrome was used, the abdominal wound healed by primary union in all but 8.2 per cent of the cases. Without mereurochrome, 12.5 per cent of the wounds were infected.

9. I believe that the use of mereurochrome as a vaginal antiseptic during labor adds greatly to the mother's safety in the event of cesarean section.

10. When mereurochrome technic is employed, the patient is not potentially infected even though she has had a trial by labor, vaginal examination or an attempt at delivery by means of forceps or the hydrostatic bag.

11. When mereurochrome is used, low cervical cesarean section has little or no advantage over the classic operation.

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494 FIRST STREET.

(For discussion, see page 723.)

NEUROLOGIC SYMPTOMS IN THE PREGNANT WOMAN*

BY CHARLES W. BURR, M.D., PHILADELPHIA, PA.

PREGNANCY is a very upsetting thing because it interferes greatly with the usual chemical processes of the body, originates new reactions, and compels organs built to do certain things to take on new and temporary functions. One complicating thing is that nature uses makeshift apparatus. Comparison of the remains of extinct animals with living forms proves and illustrates this. Man evolved, he was not created. Nature, when making man, instead of creating a wholly new machine took an old one, our prehuman ancestor, added new things to it, modifications and improvements, and made the old do new work. The human body is like an old house which has had new parts added, has been modernized and improved, but in which much out-of-date furniture has been allowed to remain. The old machinery coupled with the new cannot work without friction.

All the nervous abnormalities that occur during pregnancy are seen in other conditions; all of them, however, except pregnancy itself are pathologic. Most often the disorders of pregnancy are due to pervers-

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sion of chemical function, caused often by malfunction of those queer little organs we are only beginning to know something about, the ductless glands. First, let us consider the symptoms that are not severe enough to be called diseases. Very often the complaining woman is unjustly thought to be cranky, hysteric, or malingering; really she is ill. The symptoms I am speaking of are all sensory; they have their origin in the sensory side of the nervous system. Many women during pregnancy have supersensitive skins. They feel skin pain more acutely, though with the esthesiometer it could not be proved that they feel stimuli below the normal threshold. The pain sense is tremendously increased. It shows itself often in increased sensitiveness to heat. A woman begs to be put in a cold room, the ordinary temperature of the bedroom giving her a sense of painful heat throughout the body. In my early days when we exaggerated psychic influences, we explained such symptoms by saying, "Oh, she is a cranky woman," and did not seek any other explanation. We were wrong. This supersensitiveness is not hysterical, it has a physical basis; the sensory end organs react more strongly to stimuli than those of a person in ordinary condition, or the cerebral centers react too strongly to stimuli. Skin symptoms may go beyond sensory disorders; excessive sweating, even angioneurotic edema and other vasomotor disorders, occur. They are not psychic in origin, are not due to Freudian complexes; they have a real, physical, mechanical, and chemical basis. From similar causes women when pregnant have queer gustatory urges. They want to eat queer things. One group wants pickles and vinegar, another alkalies; another wants to chew chalk. We did not even credit them with mental disorders but blamed them for being cranky. Again we were wrong. It is not crankiness but chemical action which shows itself in consciousness by emotional irritability, which causes not only perversions of taste but also crankiness in conduct.

There is during pregnancy some alteration in the gastric and intestinal juices; and it is a natural but unconscious craving to get back to the normal, physiologic, chemical level that makes women eat or crave these things. Of course the poor woman does not know the reason, but she knows that she has a craving for something and when she gets it feels better. Vision too gives symptoms, usually not serious, but I would advise any doctor attending a pregnant woman who complains of her eyesight not to say, "Oh, they all do it," because occasionally, it may be once in five hundred times or once in fifty, but sooner or later, that dimness of vision, that bright light before the eyes, will have added to it occipital headache, a little vertigo, and then, if the doctor examines the urine, he will find the patient is on the verge of eclampsia. One of the most dangerous complications that can happen to women may reveal itself by complaints of poor vision that ninety-nine times out of a hundred is merely transitory, yet in that one hundredth case

is the precursory of an eclamptic convulsion. Smell also plays curious tricks and for the same reason. I remember a woman who was not insane, indeed she was very brilliant, who through two pregnancies got pleasure only, as far as smell was concerned, from feces; that was the only odor that gave her pleasure, and I am sure if she had been permitted to do so she would have smeared herself with ordure. With her it was not mental or moral smashup that made the change but some curious chemical change that perverted a real sense of smell. Neuralgias, of course, are very common but not evidences of serious illness. Toothache, trifacial and cardiac pain, pseudoangina, and uterine neuralgia are common. I recall a case occurring when I was a young man which frightened me greatly. Although the woman was only six months pregnant, she had, what I took to be, tremendous labor pains, referable to the womb. I sat up all night. I have never forgotten it, and it was a good lesson, but these false labor pains may certainly give not only pain to the poor suffering patient but also great distress to the young doctor who is trying to learn something of the peculiarities of pregnant women.

We come to the diseases complicating pregnancy. Probably the most important is St. Vitus' dance. Several of the textbooks on obstetrics (not on nervous diseases) say that if a child has chorea there is great danger of its recurrence during pregnancy. I do not like to differ with obstetricians, especially as I have not seen a woman in childbirth for more than a few years, but I must. St. Vitus' dance is the most frequent acute nervous disease of childhood. It is more frequent even than epilepsy. If the danger of a recurrence in pregnancy were very great, the number of cases of chorea would be very large; really it is small. I have had this experience. My colleagues and I have treated more than three thousand cases in children at the Infirmary for Nervous Diseases, and only a few have returned when pregnant. I ought to say our patients are from a stable population and would be likely to return, as they do for other diseases. I have treated thirty-two cases of chorea in mother and child, the mother having seen me in her girlhood and having brought her child years later. In none did the mother have St. Vitus' dance during pregnancy, neither in that of the child she brought to me nor in any pregnancy that she had had before, and in several cases there were two or three. That is one reason I believe the risk of maternity in the woman who in childhood had St. Vitus' dance is not very great. Certainly no one would advise a woman not to become a mother because in her childhood she had had St. Vitus' dance. The danger to herself is not great; the more important danger to the child, so far as heredity is concerned, is an increased susceptibility to rheumatism which may cause chorea. The factor of heredity is strong in rheumatism. I am talking of the true chorea of Sydenham, not of hysterical chorea and not of tic. A tic is an unwilld movement

that looks willed. A choreiform jerk is manifestly unwilled, sudden, jerky, violent, and in no degree simulates a willed movement. Hysterical chorea is always associated with other symptoms of hysteria. True chorea, in the pregnant woman, is much more serious than in children. Pregnancy rarely acts as more than a mere exciting cause of the attack. Though most often in St. Vitus' dance there is an underlying pathologic state that we call rheumatism, whatever it may be, yet several acute infectious fevers may start St. Vitus' dance, and probably some poisons that we know not of. Rarely there is no history of rheumatism or of any acute infectious fever and no endocarditis; there seem, therefore, to be a few women in whom the process of pregnancy is enough, so far as present-day knowledge goes, to cause this disease. The future will probably reveal a causative factor. Every person with St. Vitus' dance should be put to bed, and the pregnant woman quite as much as the young girl, and I say this, understanding and appreciating the importance of air and sun and moderate exercise and getting out-of-doors to keep the pregnant woman in good condition. But quiet, absolute physical rest is so vitally important in the cure of St. Vitus' dance that it is better to forego the good of outdoors and gentle exercise in order to give the woman complete muscular rest and also the mental rest that can only be gained in bed. No woman in the twentieth century can get mental rest out-of-doors. Few can get it save in the atmosphere of a well managed hospital. A modern home is rarely restful. Physical and mental rest are therapeutic necessities, and the only things that do real good in St. Vitus' dance, it does not matter what the particular cause in any given case may be. Now as to medicines, I have lived through many fashions in medicines. When I started out, we all gave Fowler's solution. Dr. Osler and Dr. Mitchell were my chiefs, and Dr. Mitchell ordered me to give all his patients three drops three times a day and increase to ten. Dr. Osler always said, "Dr. Burr, put this child to bed and keep its bowels open." Of course all were kept in bed, allowed few visitors, and properly fed. Now Osler's cure rate was exactly the same as Dr. Mitchell's in dealing with this particular disease. Today the fashionable drug is aspirin, and I am giving it faithfully, two and a half grains three times a day to all the little ones that come to my clinic, and of course in private you have to do something. I do not think that the aspirin does anything except make the family feel that the patient is getting some medicine. A written prescription is still a much worshipped, popular "godkin." Dr. Small's antirheumatic serum may prove to be very useful in cases occurring soon after an attack of acute inflammatory rheumatism. The treatment is too new to have proved its worth. If the muscle jerks are so great that something must be done or the patient will wear herself out, then you must give bromide or chloral or some other sedative to reduce excitement. There is no need for it unless the twitching is so

severe that the patient is wearing herself to death by muscular movement. Mildly to kick about does not hurt a woman or child. It does less harm than sedatives, but when the woman is bruising herself and her womb is being squeezed and pounded, you must give a sedative. Aspirin or Fowler's solution will not do any good. Of course, the great question in a severe case is, would abortion cure the mother? In the majority of cases it would not, because the chorea continues throughout pregnancy and does not cease until several weeks after the baby is born. In such cases therapeutic abortion would be useless. If, however, the mother is manifestly getting so exhausted that her life is in danger, it is justifiable and morally right to sacrifice the fetus if by so doing you can save the mother's life. But under no other conditions is it justifiable. Merely because a woman is somewhat sick, even quite severely ill, abortion is not permissible. What the maternal death rate in the chorea of pregnancy is, I do not know. It varies in the statistics of different writers. In my own experience it has occurred twice; I do not know how many cases I have seen altogether, probably thirty or forty, but the death rate of the mother has been very, very low. Recovery came during pregnancy in a few; in most, however, it came soon after natural birth. In a few cases, following my advice, the obstetrician brought on premature labor when the fetus was eight or eight and a half months old, a few weeks before the child would have been born naturally. That of course is permissible. It did good in most of my cases; in a few the chorea continued several weeks. Rarely it begins immediately or a few days after natural labor at term.

As to tetany I do not know the maternal death rate. I have only seen a few cases; all of them recovered, though the symptoms were so severe that the obstetricians wished my aid as a neurologic consultant. I have asked all my obstetric friends to tell me the maternal death rate, and they have all confessed they do not know. The statements of writers on the subject vary greatly. There is, however, a fetal death rate which some writers put quite high. The disease is rare in pregnant women, and the maternal death rate must be low. That of the fetus in some statistics has been 10 per cent. Symptomatically it is exactly like tetany occurring in rickety children, in diseases of the intestinal canal and in typhoid fever. Its cause is some disturbance of the functions of the parathyroid glands, brought about by the chemical disturbances of pregnancy.

Tetanus as a complication is historically interesting. Before its mycotic origin was known, English physicians practicing in India noticed that tetanus among pregnant women was much more frequent there than it was either in England or anywhere in the civilized world, and doctors being philosophically minded began to seek very remarkable causes and tried to prove that there was some curious racial factor in the East Indian woman that made her more susceptible to

lockjaw than was the rest of the world. When the real cause was discovered, the tetanus bacillus, the dirtiness of the women, dirt being a fruitful soil for pathogenic organisms, explained its frequency.

Epilepsy: No epileptic, man or woman, should have children. If the unborn have any right, it is the right to say, "In my stock there is no epileptic blood," because, if there is any disease that is carried down from generation to generation, it is epilepsy. There is no more terrible disease. However, epileptic women do become pregnant, and to make matters worse over the north Mediterranean coast there was and is a many centuries-old belief that pregnancy, if it does not cure epilepsy, at least prevents the fits during the carrying of the child, a most damnable, horrible belief, and one that has led to many a woman being impregnated when she should not have been. Of course, pregnancy will not in any way cure or even alleviate epilepsy. There is much discussion as to whether it can ever cause it. I do not believe it can. In the rare cases where apparently the first fit has occurred in pregnancy, the real explanation frequently is that the woman has had nocturnal fits unknown to her relatives over a long period of time. It is very much easier for me to believe that than to believe epilepsy could be caused by the physiologic process, pregnancy. It is quite common for epileptic fits to occur for years only during sleep. If the woman has some other disease coincident with the pregnancy, if, e.g., she is syphilitic, syphilitic meningitis may cause convulsions, but they are not epilepsy. There have been a few cases of the idiopathic disease reported. One, I remember, in my own experience was a forty year old woman who was alleged to have had her first convulsion during pregnancy and was still living at fifty. It is much easier for me to believe she had nocturnal epilepsy for years, even though I could not prove it, than that pregnancy caused it. The epileptic pregnant woman should be treated thoroughly, but be sure that you are treating epilepsy and not eclampsia. She may die if she does not have the proper eclamptic treatment.

The next disease is hysteria. It is the rarest and greatest disease in the world, and it is also the great scrap bag into which we throw every bizarre and queer thing when we do not want to confess ignorance or when we have gone mad on the psychic origin of disease. A pregnant woman will show hysteria provided hysteria is in her when she is born. You do not acquire hysteria, you are born with it. It is part of your very protoplasm; you do not get it because pregnant, or because your favorite son turns out to be a murderer, or your favorite sister a prostitute. Pregnancy in itself does not cause hysteria, but given the hysterie soil either of two things can happen, improvement or worsening, and that is one of the paradoxes of hysteria that it does not follow logic, but nothing in biology does. I have seen more than a few single women who were hysterical because they had an unconscious hunger

for a child. They did not realize the cause; it was not sex hunger but motherhood hunger, the same thing that the female lion, tiger, and dog have. I have seen several of these young women, foolish and hysterical before, turn into very healthy and good mothers when that unconscious hunger was satisfied. On the other hand pregnancy may make patent a latent hysteria. A woman may, under pregnancy, develop a few or many hysteric symptoms. Hysterical mutism and hemianesthesias are particularly interesting, and the former may be mistaken for a true aphasia caused by organic disease. The best treatment for hysteria is the rest cure; keep the patient away from loving relatives, never discuss symptoms with her, and give long bed rest, and later exercise. That is true both of the hysteria of pregnancy and hysteria from any other cause.

And now we come to two interesting diseases which pregnancy alleviates. One, Graves' disease, it occasionally cures. Certainly to look at a woman (and there are about eight women with Graves' disease to one man) with Graves' disease, if logic were of any account in this world, we would all say that those bulging eyes, the tense face, the manie manner, the tremor, the heart disorder, all mean "Don't become a mother," and yet, women with Graves' disease who become pregnant are almost never injured by their pregnancies, and very frequently all the symptoms pass into the background and sometimes cease permanently. Do not imagine I advise pregnancy as a cure for Graves' disease. It need not, however, alarm the doctor when he sees a pregnant woman with it. The other disease, relieved by pregnancy, is myasthenia gravis. It, however, returns after the child is born. The explanation of the temporary disappearance of symptoms is similar to that in exophthalmic goiter, namely, that there is something in the chemistry of the body during pregnancy that fills a deficiency, or remedies a perversion, which is the cause of exophthalmic goiter and myasthenia gravis. The ductless glands stand in some causal relation to both diseases.

None of the diseases I have been speaking about cause any gross organic cerebrospinal lesions. As to aphasia, hemiplegia, apoplexy, occurring in pregnancy, there is nothing that in and of itself should cause a rupture of a cerebral artery. If, however, the woman of child-bearing age has hardened arteries before the time she ought to, the plethora present may slightly increase the stress put on the blood vessels and thereby cause a rupture and a true apoplexy. If she has endocarditis, she may suffer from an embolus. Very rarely the pregnant woman will have a stroke with hemiplegia and aphasia and die, and on examination you will find no gross cerebral lesion. Always these cases are cardiorenal and vascular. The patients die of nephritis. Occasionally, and I can recall one case, very serious cerebral symptoms may be cured spontaneously. A woman during two successive preg-

nancies in the eighth month in each suddenly lost her speech and had a slight palsy of the right side of the face. She had no signs of cardio-renal or vascular disease. The aphasia which was real and not a mere hysteric mutism both times lasted between two and three months after a normal labor. I believe it was a toxemic attack, that her brain was locally poisoned, and that somehow it was tied up with the pregnancy itself.

There is no spinal cord disease that can be brought about by pregnancy alone, but once in a very great while you will see queer, aberrant spinal cord symptoms occurring which you cannot account for. A woman in the fourth month of her pregnancy, on getting out of bed one morning, realized she was awkward. She felt as she supposed one feels when drunk. Her legs would not do what she told them to. I found she had ataxia in both legs, also slight anesthesia and slight loss of motor power. Though her legs were somewhat weakened, the reflexes were normal, deep sensibility was retained, and bladder and rectal control was good. There was no pain and the nerve trunks were not sensitive to pressure. She was not syphilitic. It was her first child. I could not find any cause for her condition. She went on to term and, four or five months after the birth, recovered and for years has remained well. Some writers claim such cases are the result of a normal pregnancy and not due to some unknown complication.

One word as to so-called pressure palsies: Of course the head coming down is bound to press on the sacral plexus, the cords that go to make up the sciatic nerve, and there is bound to be pain, and there may be pressure palsy corresponding to that in a man who uses a crutch. Dr. Dereum years ago reported a case in which the gluteus maximus muscle was atrophied some weeks after the palsy came on. Such accidents are bound to happen but fortunately rarely and are purely mechanical. In addition to these true pressure palsies there is, I believe, a multiple neuritis involving both legs and not due directly to pressure on the cords that go to make up the nerves but to some intoxication. The palsy is almost entirely motor, like a lead neuritis, only first affecting the legs instead of the hands. I have seen the condition in childbirth and, I think, the explanation is an intoxication of the nerve trunks. My impression is, but I have no statistics to prove it, that pregnancy increases the likelihood of a painful, acute, alcoholic, multiple neuritis in women who drink.

1918 SPRUCE STREET.

(For discussion, see page 727.)

MODERN CONCEPTIONS OF RENAL DERANGEMENTS IN PREGNANCY*

BY G. KOLISCHER, M.D., CHICAGO, ILL.

THE modern conceptions of renal derangements in pregnancy are based on the application to this topic of our advanced general knowledge of the normal and pathologic physiology of renal function.

One fundamental point is that the kidneys act as an eliminatory terminal only.

The intermediate structures interposed between alimentary tract and kidneys act under normal conditions as temporary deposits of the somatic waste products and consequently also play an important rôle in the urinary excretion. Biologists acknowledge their dignity by applying to them the term adventitious kidney.

Under pathologic conditions a lesser or larger amount of these metabolic slags is retained for an extended time within these intermediate structures.

Any renal disturbance has to be considered as a local manifestation of a general derangement and not as an independent idiopathic disease.

In pregnancy primarily two eliminatory disturbances come under consideration, the nephritic and the nephrotic condition. The former is based on a capillary toxicosis and manifests itself within the kidney mainly as glomerulitis, the latter is accompanied by degeneration of the tubular epithelia.

Functionally nephritis is characterized by the retention of organic waste products, nephrosis by the retention of chlorides.

Retention of the organic slags may occasionally occur in the intermediate structures only, so that in such instances the NPN and creatinine contents of the blood show normal figures because the surplus of the organic slags never reaches the blood. The indicator for this form of retention is the appearance of pronounced indicanemia. Incidentally it may be mentioned that in grave gestation toxicosis, urobilin and bilirubin are found in the blood.

The appearance of edema or hydrops gravidarum may be explained in two ways. It is known that toxic capillaritis produces an extreme permeability of the capillary walls. Therefore the nephritic edema may be considered a toxic transudation, while the edema in nephrosis is an osmotic phenomenon due to the attraction of water by the accumulated chlorides within the intermediate structures.

Nephrotic disturbances are more common in pregnancy than the nephritic ones.

*Read at the meeting of the Chicago Gynecological Society, June 22, 1928.

Nephrosis is prognostically more favorable than nephritis; it is for instance never accompanied by a true retinitis which will occur in a certain percentage of nephritic cases.

Nephrosis practically never forms an indication for interruption of pregnancy; severe nephritis with its concomitant side issues is one of the most urgent factors in deciding upon the forced emptying of the uterus.

All these considerations make it evident that the traditional routine examination in the prenatal clinic is insufficient. It has to be supplemented by systematic and complete examination of the blood, by regular examination of the ocular background, by estimating the daily output of chlorides and by testing the functional flexibility of the kidneys.

The connection of renal disturbances and eclampsia may be twofold.

Either the additional metabolic slags originating in embryo and placenta are not sufficiently disintegrated in the pertinent organs and then produce pathologic changes in the eliminatory system, or an already existing nephritis reduces the proper elimination of all the organic waste products, leading to pseudouremia.

That the end products of the intrauterine metabolism have a specific influence on the kidney different from that exerted by bacterial toxins is made probable by the fact that the latter produce capillaritis and glomerulitis while the toxins of intrauterine origin produce renal arteritis, as proved by postmortem examination after eclamptic death.

It may also be mentioned that in the preeclamptic and eclamptic stages pronounced functional disturbances are to be observed in the ocular arteries. The discovery that in a certain category of cells comprised as the reticuloendothelial system reside the defensive forces of the body threw considerable light on the eliminatory disturbances in pregnancy. Among other functions these cells have the capacity of storing and disintegrating toxins of extraneous and indigenous origin.

It is also known that the efficiency of these cells may be stimulated by the aseptic protein shock.

It was observed that in a good many pregnant women, especially during the latter half of gestation, the efficiency of the reticuloendothelial system is impaired.

It is easily understood that this fact together with the increased metabolism of pregnancy places the eliminatory system under a double disadvantage, excess of waste products and weakening of the defensive forces.

That explains for instance the fact that under this handicap previously existing slight abnormalities may develop into severe and lasting involvements of the upper urinary tract, as demonstrated by Danforth and Corbus.

It also emphasizes the importance of cystoscopic and roentgenologic examination if pus appears in the urine of a pregnant woman.

Methods have been developed to estimate in the living subject the efficiency, respectively deficiency, of the reticuloendothelial system.

It seems that proper consideration of the reticuloendothelial system furnishes another link for our diagnostic, prognostic and therapeutic reasoning.

It may be suggested that the testing of this system may be accepted as an integral part of the examination of pregnant women, at least in all instances in which renal disturbances become evident.

It may also be considered that if in spite of our therapeutic efforts the efficiency of the reticuloendothelial system does not rise or even deteriorates, this symptom may round out the indication for emptying the uterus, although the additional syndrome does not yet furnish a cogent indication.

At any rate the discovery of a weakening of this system calls for the administration of the protein shock together with all the other antinephritic measures and excludes waiting until the toxins have invaded, inundated and overwhelmed all the eliminatory cells.

(For discussion, see page 730.)

A SURVEY OF CESAREAN SECTION AT THE METHODIST EPISCOPAL MATERNITY*

BY O. PAUL HUMPSTONE, M.D., BROOKLYN, N. Y.

THE present widespread effort to report the incidence of cesarean section in different hospitals of the United States is the best example of the American principle of mass study of efficiency which has yet been applied to medical science. It will function to harmonize, revise, or justify divergent judgments as to the use of cesarean section.

A committee of the Brooklyn Gynecological Society has published such a study for our Borough.† I desire to enter into a somewhat more minute survey of the cases in our own institution and to draw a few deductions from our records and experiences.

TABLE I. CESAREANS AT THE METHODIST EPISCOPAL MATERNITY

	TOTAL CASES	TOTAL CESAREANS	DEATHS	MORBIDITY	CESAREAN RATIO
1920	800	35	3 or 8.5%	13 or 37.0%	1 in 23.0 or 4.3%
1921	838	46	2 or 4.3%	16 or 34.7%	1 in 18.2 or 5.4%
1922	790	43	1 or 2.3%	13 or 30.0%	1 in 18.3 or 5.4%
1923	938	62	2 or 3.2%	28 or 45.0%	1 in 15.1 or 6.6%
1924	1258	63	5 or 7.8 %	22 or 34.7%	1 in 19.9 or 5.0%
1925	1535	51	2 or 3.9%	22 or 43.1%	1 in 30.0 or 3.3%
1926	1799	59	0	14 or 23.7%	1 in 30.4 or 3.2%
Total	7958	359	15 or 4.3%	128 or 35.6%	1 in 22.1 or 4.5%

*Read at a meeting of the Brooklyn Gynecological Society, December 2, 1927, and at the New York State Sectional Meeting of the American College of Surgeons.

†See this Journal, 16: 307, September, 1928.

We have arbitrarily taken the case histories of the last seven years, since many of the earlier charts are too incomplete to be really useful as premises for deduction. We have arranged our study in tabulated form and appended to each table a few comments.

COMMENT

The incidence of 1 in 22 or 4.5 per cent for the series, shows a marked diminution in the last two years of 1 in 30 or 3+ per cent. This may be definitely laid to several factors: A radical change of view on the use of cesarean section in the treatment of preeclamptic toxemia and eclampsia, and secondly to better antepartum care, study of contracted pelvis with test of labor in all cases not absolutely contracted, and consultation before a primary cesarean section.

We believe this incidence to be nearly correct for an obstetric institution handling the class and types of patients such as we have, and applying the indications for cesarean section as we do.

Mortality and morbidity.—The mortality is analyzed in a later chart. Morbidity was present in 35 per cent of the cases, being judged on an observation of a temperature of 100.4° for two consecutive days, excepting the twenty-four hours after delivery. The records show an average stay in the hospital of between four and five days beyond the normal case.

We believe the morbidity definitely was diminished by the use of 4 per cent mercurochrome as a vaginal preparation before cesarean section. In the year 1926, when this was done for the first time in every case, the morbidity was lowered from the average 35 per cent to less than 24 per cent and not a mother was lost.

* * * *

TABLE II. INCIDENCE IN WARD AND PRIVATE PATIENTS

Deliveries—1925		Cesareans—1925		Cesarean Ratio	
Private	Ward	Private	Ward	Private	Ward
868	667	46	6	1 in 21+ or 4.7%	1 in 111 or 0.9 %
Deliveries—1926		Cesareans—1926			
Private	Ward	Private	Ward	Private	Ward
1039	760	54	5	1 in 19 or 5.2%	1 in 152 or 0.75%

COMMENT

In most hospital reports of cesarean section, it is the ward service only which is reported. Our hospital is composed of one-third private patients, one-third semiprivate and private wards, and one-third ward beds. The number of private patients is therefore greater than ward and the incidence of cesarean section is greater in private patients because of several factors, chief of which is that the private work of the heads of service is composed in a large part of cases which come to them as expert obstetricians because of previous difficult labors with the loss of the baby, of previous cesarean section. I have at the present time seven cases of previous cesarean section under observation, not one of which was done in our institution. Furthermore, cases

come diagnosticated as contracted pelvis or other complications of pregnancy which may demand cesarean section. The responsibility placed on us to obtain a live baby demands that we take as little chance of the loss of the baby in birth as is compatible with good obstetric judgment.

* * * *

TABLE III. ANALYSIS OF MATERNAL DEATHS; 15, OR 4.3 PER CENT

INDICATION FOR CESAREAN		ACUTE CARDIAC DILATATION	INFEC- TION	CEREBRAL HEMOR- RHAGE	POSTOPER. SHOCK
Contracted pelvis	5 or 2.7%	2	2	0	1
Toxemia and eclampsia	7 or 17.5%	0	5	1	1
Antepartum hemorrhage	0	0	0	0	0
Other indications	3 or 2.4%	0	3	0	0

COMMENT

The mortality of 4.3 per cent is greater than the general mortality of the department for these years (0.73 per cent). Nearly 50 per cent of the mortality is in the eclampsia and toxemia cases; the mortality in all other indications being under 3 per cent. The test of labor, particularly with ruptured membranes adds to the mortality from sepsis and cardiac complications in contracted pelvis. The striking absence of mortality in the antepartum hemorrhage cases is referred to in a later table.

* * * *

TABLE IV. ANALYSIS OF FETAL DEATHS; 22 OR 6.1 PER CENT

INDICATION FOR CESAREAN		
Premature, 18	Preeclampsie toxemia	8
	Eclampsia	2
	Ablatio placentae	1
	Accidental hemorrhage with toxemia	1
	Accidental hemorrhage without toxemia	2
	Acute gangrenous appendicitis	1
	Rupture of cesarean scar	1
	Cardiac decompensation	1
	Chorea	1
Term, 4	Monsters	2
	Impacted shoulder	1
	Blocking of pelvis by fibroid tumor	1

COMMENT

Fetal mortality of 6.1 per cent, included 18 prematures, 12 of which were in the eclamptic group of indications, 6 where the cesarean section indication was strictly in the mother's interest. Four full-term babies included 2 monsters. These occurred before the use of the x-ray examination as a routine before cesarean section, which will generally eliminate such a mistake. The impacted shoulder was in a uterus tonically contracted so as to be unsafe for any attempt at delivery below, potentially infected and in which a hysterectomy was done. Likewise the fibroid case, the baby dead on admission, impossible of delivery from below, a cervical fibroid completely blocking the pelvis. A hysterectomy was done. Not one normal baby was lost in the series.

* * * *

TABLE V. INDICATIONS

	TOTAL CESAREANS	CONTRACTED PELVIS	ECLAMPSIA AND PREECLAMPTIC TOXEMIA	ANTEPARTUM HEMORRHAGE	OTHER INDICATIONS
1920	35	19	2	1	13
1921	46	26	4	0	16
1922	43	20	2	1	20
1923	62	29	9	3	21
1924	63	26	13	6	18
1925	51	28	2	3	18
1926	59	33	8	1	17
Total	359	181	40	15	123

COMMENT

This table shows the general indications employed in the series. The 123 other indications will be analyzed more carefully later on. It should be noted that the various indications do not differ very materially in the different years in proportionate employment except the pre-eclamptic toxemias in 1924.

* * * *

TABLE VI. CONTRACTED PELVIS

TYPE		FETAL DEATHS	MATERNAL DEATHS
Not given (early records incomplete)	46	0	1
Funnel	35	1	1
Flat	22	0	0
Generally contracted	56	0	9
Rachitic	9	1	3
High assimilation	12	0	0
Tubercular hip	1	0	0

COMMENT

Just criticism may be made of the first item. Such inaccurate records at the present time would not pass our monthly study of all contracted pelvises in the staff meetings. Only 32 of the series had an absolute indication of less than $7\frac{1}{2}$ cm. true conjugate. The rest all had a test of labor of from six to fifty-four hours except the tubercular hip case which was in the acute stage with open sinuses, and in such a poor general condition that no labor was deemed wise.

* * * *

TABLE VII. ECLAMPSIA AND PREECLAMPTIC TOXEMIA

YEAR	TOTAL ECLAMPSIA	DEATHS	TOTAL PREECLAMPTIC	DEATHS
1920	3	1	9	1
1921	3	0	8	0
1922	5	1	10	1
1923	5	1	8	1
1924	9	0	5	1
1925	3	1	4	1
1926	12	2	5	0
Total	40	6, 14+	49	5, 10+

Treated by Cesarean
Toxemia of Pregnancy 34—5 Deaths 14 + %
Eclampsia 6—2 Deaths 33½%

COMMENT

This table shows all the eclamptics and preeclamptic toxemias treated in the years studied, and below, those of this series which were treated by cesarean section, 40 cases out of 89. While the mortality of the whole series of eclamptics was 14 per cent, that of the six cases treated with cesarean section was $33\frac{1}{3}$ per cent showing the now well-known fact that when a patient has gone on to convulsions, she has ceased to be a suitable case for surgery except in absolute contraction of the pelvis, and the occasional primipara in the ninth month with live baby and long undilated cervix, who will not respond to treatment.

Of the preeclamptics, 34 out of 49 were treated with cesarean section with a slightly increased mortality over the series 14 per cent instead of 10 per cent for the whole series. We now feel that in a primiparous woman with no labor and a viable baby and increasing severity of symptoms notwithstanding treatment, we find our only indication for the use of cesarean in preeclamptic toxemia.

* * * *

TABLE VIII. ANTEPARTUM HEMORRHAGE

TYPE		FETAL DEATHS	MATERNAL DEATHS
Accidental hemorrhage with toxemia	3	2	0
Accidental hemorrhage without toxemia	2	2	0
Placenta previa	10	0	0

COMMENT

This table shows the employment of cesarean section in antepartum hemorrhage, with no maternal deaths in the series and no fetal deaths in the placenta previas. We now believe that all central placenta previas after viability of the child should be treated by classical cesarean section on the theory that the lower zone of the uterus is to be protected from stretching and traumatism as much as possible, thus assuring its contraction and retraction to avoid the postpartum bleeding which is the fatal factor in these cases.

* * * *

TABLE IX. OTHER INDICATIONS

TYPE		FETAL DEATHS	MATERNAL DEATHS
Fetal dystocia	15	0	1
Cervical dystocia	19	0	1
Postoperative dystocia	10	0	1
Tumors in pelvis	9	1	0
Fibroid	2	0	0
Ovarian cysts	2	1	0
Abnormal presentations	3	1	0
Cardiac condition	2	0	0
Pulmonary condition	1	0	0
Systemic disease	1	0	0
Intestinal obstruction	1	0	0
Appendicitis, acute gangrenous	1	1	0
Pendulous abdomen	2	0	0
Previous cesarean (no other indication given)	43	1	0
Uterine inertia	7	0	0
Psychosis	1	0	0
Uterine and vaginal congenital malformations	4	0	0

COMMENT

This table shows other indications than those already enumerated, 123 cases out of a total of 359.

Fetal Dystocia. After a test of labor, all the babies weighing over 9 pounds with no engagement and retraction of the lower zone.

Cervical Dystocia. After long test of labor, with not over 2½ fingers dilatation, thick firm edematous cervixes and contraction ring development, and head still just dipping into the brim. I know of no more difficult complication to successful delivery than this situation.

Postoperative Dystocia. Previous ventral fixation. Previous ligament operations with complete plastic pelvic repair particularly amputation of the cervix. Previous interposition operations with amputation of the cervix and failure to sterilize.

Tumors blocking the pelvis, not reducible and making delivery by the natural passages impossible.

Abnormal Presentation. Irreducible chin posterior in a primipara and the impacted shoulder case noted before with tonic uterus threatening rupture.

Cardiac Conditions. Chorea gravidarum and two cases of decompensated mitral stenosis. All sterilized.

Pulmonary Conditions. Two cases of active tuberculosis in primiparae with sterilization.

Systemic Disease. A case of marked asthenia from prolonged pyelitis and great desire for a child.

Intestinal Obstruction. From a band complicating the last month of pregnancy, impossible to be dealt with until the uterus had been emptied.

Acute Gangrenous Appendicitis in the eighth month of pregnancy. Case reported in full by Dr. Robert Wilson in *Surgery Gynecology and Obstetrics*.

Pendulous Abdomen. Two cases of threatened colporexis which could not be controlled by binders.

Previous cesarean done elsewhere and wherein the reason for the previous cesarean could not be determined and the condition of the scar did not warrant labor.

Uterine Inertia. Primary uterine inertia with ruptured membranes and questionable proportion of baby to pelvis.

Psychosis. An acute case in which the same condition had appeared in a previous pregnancy, with sterilization after consultation with psychiatrist.

Uterine and Vaginal Malformations. Two cases of double vagina with failure to dilate. One case of pregnancy in a rudimentary horn of the uterus, one case of uterus didelphys with failure to dilate and engage.

* * * *

TABLE X. ANALYSIS OF CASES WHERE HYSTERECTOMY OR STERILIZATION WAS DONE

INDICATIONS	STERILIZED DURING FIRST CESAREAN	STERILIZED DURING SUBSEQUENT CESAREAN	HYSTERECTOMY
Toxemia	3	4	0
Eclampsia	0	1	0
Contracted pelvis	1	16	3 All infected on admission
Antepartum hemorrhage	0	0	0
Fibroid uterus	1	0	2
Chorea gravidarum	1	0	0
Previous cesarean (other indica- tion not given)	0	10	1
Uterine inertia	0	0	1 Potentially infected
Abnormal presentation	0	0	1
Cervical dystocia	1	0	0
Dystocia due to previous opera- tion	1	0	0
Psychosis	1	0	0
Pulmonary tuberculosis	2	0	0

COMMENT

Hysterectomy we believe is seldom called for when cesarean is done. Large fibroids which cannot easily be enucleated and cases which are frankly infected, are best dealt with by this treatment. Sterilization is done by double silk ligature of each tube and division of the tube between the ligature and burial of the uterine end by a purse-string suture of catgut. Sterilization is offered to a woman who should not have more children; and we deem a patient who has had three cesarean sections such a woman. The truth of this dogmatic statement is yet to be fully determined.

The conclusions from this study are included in the comments on each chart and do not need reiteration. The operations were all classical cesarean sections.

327 WASHINGTON AVENUE.

PROCIDENTIA

A STUDY OF 683 CASES TREATED BETWEEN 1875 AND 1928 AT THE FREE HOSPITAL FOR WOMEN, BROOKLINE, MASSACHUSETTS

BY GEORGE VAN S. SMITH, M.D., WILLIAM P. GRAVES, M.D., AND
FRANK A. PEMBERTON, M.D., BOSTON, MASS.

PROCIDENTIA is here considered as an advanced degree of uterine prolapse in which the cervix, or even the whole uterus, protrudes through the introitus and appears outside the vulva. The condition is accompanied by a variable amount of vaginal relaxation of the anterior and posterior walls, as a cystocele and rectocele. In the great majority of cases the trauma of childbirth is the chief predisposing cause. Other factors include improper care during the puerperium, physical exertion (occupation, coughing, sudden strains, etc.), lack of timely preventive surgical repair, marked atrophy of the pelvic organs, structural abnormality of the bony pelvis, and finally a general qualitative deficiency in the tone and elasticity of the pelvic tissues.

AGE TABLES

A protrusion or "falling of the womb" was first noticed between the ages of		The number of patients seen or treated between the ages of	
15 and 20 by	3 patients	15 and 20 was	1
20 and 25 by	27 patients	20 and 25 were	3
25 and 30 by	57 patients	25 and 30 were	17
30 and 35 by	87 patients	30 and 35 were	55
35 and 40 by	121 patients	35 and 40 were	93
40 and 45 by	115 patients	40 and 45 were	131
45 and 50 by	83 patients	45 and 50 were	104
50 and 55 by	66 patients	50 and 55 were	101
55 and 60 by	43 patients	55 and 60 were	68
60 and 65 by	31 patients	60 and 65 were	64
65 and 70 by	8 patients	65 and 70 were	33
70 and 75 by	4 patients	70 and 75 were	12
75 and 80 by	1 patient	80 and 85 was	1
Indefinite—37 patients			

Between 1875 and 1928 a diagnosis of procidentia was made on 683 cases seen at this clinic, exclusive of many cases in the out-patient department that were not subjected to operative treatment.

The youngest patient at the time of treatment was fifteen years of age, the oldest eighty-three.

FAMILY HISTORY

Tuberculosis	52	7.6 per cent
"Cancer"	46	6.7 per cent

PREVIOUS SURGICAL HISTORY

Dilatation and curettage	28	Hemorrhoidectomy	9
Hysterectomy	7	Fistula in ano	2
Operation on adnexa	12	Gall bladder operation	3
Bartholin's abscess	2	Appendectomy	25
Vaginal repair operation (not for procidentia)	68		
Operation for suspension of uterus	23		
Repair operation for procidentia	18		
Inguinal hernia repaired	3		
Umbilical hernia repaired	1		
Postoperative hernia repaired	3		

MARITAL HISTORY

Nineteen patients, 2.78 per cent, were unmarried and gave no history of pregnancy. Seven married patients had never been pregnant, a sterility percentage of only 1.05. If the six patients who had had abortions or miscarriages but no children be included with those who were never pregnant the percentage of infertility becomes only 1.95, a very low figure compared with the average sterility percentage of 10 to 16 among married women in general.

MENSTRUAL HISTORY

One hundred and eighty-seven patients had passed the menopause when symptoms of procidentia began, 27.3 per cent. Of the other 496 patients 104, or 20.9 per cent, had some menstrual abnormality, chiefly in the form of mild dysmenorrhea or some irregularity in catamenia, or both. In no instance was abnormal menstruation a major complaint.

OBSTETRIC HISTORY

At the time when patients were first seen or treated

102 had had 1 child	21 had had 9 children
120 " " 2 children	10 " " 10 "
112 " " 3 "	10 " " 11 "
106 " " 4 "	2 " " 12 "
59 " " 5 "	1 " " 13 "
42 " " 6 "	1 " " 14 "
35 " " 7 "	1 " " 15 "
28 " " 8 "	1 " " 20 "

Four patients had given birth to twins, 0.6 per cent. The average number of children per married patient was 3.92.

In 128 instances it was not mentioned in the records whether the labors had been normal or instrumental. Of the remaining 523 patients

237, or 45.3 per cent, stated that they had had normal labors, and 286, or 54.7 per cent, stated that they had had one or more instrumental deliveries. They are tabulated as follows:

1 instrumental delivery	167	5 instrumental deliveries	9
2 " deliveries	57	6 " "	8
3 " "	23	8 " "	1
4 " "	19	9 " "	2

Seven patients, 1.07 per cent, of the 651 who had children were reported as having had one breech delivery.

The following table shows how many labors patients had before symptoms of procidentia were noticed. It is not intended to indicate any time relation, however, for the interval between the last labor and the onset of procidentia varied from less than one month to forty-five years.

Before onset of symptoms	152	patients had had	1 labor
" " " "	108	" " " "	2 labors
" " " "	104	" " " "	3 "
" " " "	83	" " " "	4 "
" " " "	55	" " " "	5 "
" " " "	35	" " " "	6 "
" " " "	29	" " " "	7 "
" " " "	22	" " " "	8 "
" " " "	18	" " " "	9 "
" " " "	9	" " " "	10 "
" " " "	6	" " " "	11 "
" " " "	2	" " " "	12 "
" " " "	1	" " " "	13 "
" " " "	1	" " " "	14 "
" " " "	1	" " " "	15 "
" " " "	1	" " " "	20 "
" " " "	1	" " " "	1 miscarriage
" " " "	3	" " " "	twins
Insufficient data	20		

INTERVAL BETWEEN LAST LABOR AND ONSET OF PROCIDENTIA

In 175 cases symptoms began	1 year or less after preceding labor
" 70 " " " 1 to 2 years	" " " "
" 40 " " " 2 " 3 "	" " " "
" 18 " " " 3 " 4 "	" " " "
" 12 " " " 4 " 5 "	" " " "
" 20 " " " 5 " 6 "	" " " "
" 18 " " " 6 " 7 "	" " " "
" 13 " " " 7 " 8 "	" " " "
" 19 " " " 8 " 9 "	" " " "
" 67 " " " 10 " 15 "	" " " "
" 47 " " " 15 " 20 "	" " " "
" 42 " " " 20 " 25 "	" " " "
" 28 " " " 25 " 30 "	" " " "
" 24 " " " 30 " 45 "	" " " "

Unrecorded—58

Thus in 48 per cent of patients symptoms began one month to three years after the preceding labor; in 16.6 per cent they began three to ten years later; and in 35 per cent they began from ten to forty-five years afterward.

SYMPTOMS

683	patients	complained	of	protrusion or "falling of the womb"
118	"	"	"	backache
214	"	"	"	urinary incontinence
77	"	"	"	urinary frequency
16	"	"	"	difficult micturition
14	"	"	"	burning micturition
9	"	"	"	fecal incontinence
49	"	"	"	bearing down in pelvis
6	"	"	"	pain in lower abdomen
5	"	"	"	swelling of abdomen

The patients who complained of abdominal swelling were found to have large tumors, one of which was an ovarian cyst weighing 64 pounds. Another symptom very common but rarely recorded, is fatigue. Most of the patients with procidentia suffered from fatigue though the symptom was not systematically recorded in the histories of this series. Numerous factors contribute to this sense of tire, among them being the discomfort of the protruding mass, the mental drain of having the attention constantly fixed on a genital abnormality, the fear of cancer, the drag and pressure from lack of pelvic support, and the backache and pain in the loins that result from the abdominal relaxation that usually accompanies procidentia. From a constitutional standpoint the patients are as a rule naturally strong healthy prolific women, with a tendency to obesity.

DURATION OF SYMPTOMS

90	patients	had	had	symptoms	for	1	year	or	less
86	"	"	"	"	"	"	1	to	2 years
89	"	"	"	"	"	"	2	to	3 "
71	"	"	"	"	"	"	3	to	4 "
42	"	"	"	"	"	"	4	to	5 "
150	"	"	"	"	"	"	5	to	10 "
52	"	"	"	"	"	"	10	to	15 "
31	"	"	"	"	"	"	15	to	20 "
20	"	"	"	"	"	"	20	to	30 "
12	"	"	"	"	"	"	30	to	38 "
17	"	"	"	"	"	"	"	"	"many years"
23	"	"	"	"	"	"	"	"	"duration not stated"
1	patient	"	"	"	"	"	"	"	"several years"

Thus 41.1 per cent of patients had had symptoms from one month to three years, 17.2 per cent had had symptoms from three to five years, 23.3 per cent from five to ten years, and 17.9 per cent from ten to thirty-eight years.

LOCAL EXAMINATION

When the uterus can be palpated through the inverted vagina and is found to hang below the plane of the introitus, the procidentia is complete. Complete procidentia was diagnosed in 100 cases of this series and 6 of these were unmarried patients. The condition is also found more often among the older patients whose small, atrophied uteri slip easily through a relaxed pelvic outlet. In the remaining 583 patients

the cervix protruded for a variable distance, usually 2 to 10 cm., depending on the amount of pelvic relaxation and cervical hypertrophy present.

OPERATIVE TREATMENT*

When operative procedures are undertaken for the treatment of procidentia the object in view is to remove diseased tissue and to restore the structures as nearly as possible to their normal anatomic positions and relationships. By 1905 it had become quite evident at this clinic that either vaginal or abdominal operation alone was inadequate for attaining anatomic results that would be permanent. Between 1905 and 1910 Dr. William H. Baker and Dr. William P. Graves developed a more or less standardized technic for performing the "double operation," i.e., the plastic vaginal operation and the abdominal operation for suspension. Except for minor variations the technic of the operative procedures has been as follows:

1. The cervix, which in most cases is hypertrophied, elongated and covered with cornified epithelium, is amputated according to Hegar's method. A circular incision is made below the level of the bladder and the endocervix is cored out for a variable distance, depending on the degree of elongation. The cervix is then amputated; bleeding vessels are ligated carefully, and the mucous membrane is stitched to the stump by interrupted sutures. The lower portion of the bladder is thus given a higher insertion on the uterus and can be suspended more adequately by the abdominal operation.

2. The cystocele is reduced by the operation of anterior colporrhaphy or colpoplasty. The object in this procedure is to remove redundant vaginal mucous membrane and to plicate the fibromuscular tissue lying between it and the bladder mucosa. It is frequently advisable to carry the denudation well down along the urethra and to plicate the periurethral tissues, especially at the neck of the bladder, in order to cure urinary incontinence.

3. The rectocele is reduced and the lacerated perineum restored to normal by the operation of perineorrhaphy or perineoplasty. In this procedure the object is to remove redundant vaginal mucous membrane, to plicate by means of the fascia the bulging lower portion of the rectovaginal septum, and to approximate the levator ani muscles in front of it for the purpose of making a new perineal body. A modified Emmet's perineorrhaphy was performed in earlier years, but later Clark's perineorrhaphy was adopted, since it effects a firmer and more permanent reduction of the rectocele than can be obtained by the Emmet method.

4. Abdominal operation. The object in this procedure is to utilize the abdominal wall and the ligamentous supports of the uterus to relieve the pelvic floor of some of its burden. In the absence of other pathology, if the uterus can be brought to the abdominal wall without leaving too much slack below, it is suspended by the Olshausen technic. The round ligaments, at a point usually about one centimeter from their insertions, are stitched to the lower abdominal wall on either side of the midline by means of doubled sutures. These are passed under the round ligament, through the abdominal peritoneum, rectus muscle, and aponeurosis and back through the same structures, so as to include enough tissue to give a firm hold for the knot which is tied tightly inside the abdomen. Frequently, if

*For a detailed description and illustration of the technical methods that are here only briefly mentioned, the reader is referred to Graves' *Gynecology*, 1928. Fourth Edition. Part III.

the patient has passed the menopause, the fundus between the round ligament fixation is scarified and sutured to the lower abdominal peritoneum to give additional support and to preclude the chance of intestinal obstruction. If it is evident that there will be too much "slack" with a simple suspension, or if other pathologic findings warrant, a supravaginal hysterectomy including tubes and ovaries is performed. The stumps of the round and broad ligaments are sutured to the cervical stump, the vesicouterine flap being drawn over all and sutured to the posterior side of the cervical stump. In some cases this has been considered sufficient support for the remains of the cervix and the vagina; but when this has seemed inadequate, the cervical stump has been fixed to the abdominal wall in the manner of an Olshausen operation. Braided silk (No. 7), doubled, was formerly used exclusively for suspending the uterus or the cervical stump, but in the last five years it has for the most part been given up in favor of catgut on account of the occasional danger of sepsis and persistent sinus. Silk, linen, and catgut have all been tried and silk has been found most effective. If catgut be used for the suspension sutures, the contiguous peritoneal surfaces included in the knot must be scarified.

5. Inasmuch as a diastasis, or separation, of the rectus muscles is usual in patients with procidentia, it is considered an important part of the reconstructive operation to approximate them. If the muscles are not brought together the abdominal wall is left weak and bulging, giving inadequate support to the viscera. The resulting poor posture contributes in varying degree to backache and pain in the flanks. Well-approximated rectus muscles are necessary for preserving the integrity of the uterine suspension. The technic of approximation is as follows: The midline incision is continued upward through the skin and fat for a distance of 5 to 12 cm. The opening in the aponeurosis, made by severing the umbilicus, is closed. The recti muscles are then approximated by placing interrupted figure-of-eight pulley stitches at the mesial edges of the muscle sheaths. These sutures when tied, plicate the intervening fascia. The suture material used is No. 2 tanned catgut, doubled. Care must be exercised to avoid pinching or otherwise traumatizing the intestines during this part of the operation. It is performed before the peritoneum is closed. Approximation of the recti muscles was a part of the operative procedure in 139 cases of the present series.

If the procidentia is large and there is doubt about the patient's general condition and ability to undergo a long operation, it is customary to perform the reconstruction in two stages, the second operation being done two to four weeks after the first. In this event repair of the cystocele and rectocele, or only the rectocele, is deferred until the second operation. In the series under consideration the reconstruction was completed in two operations in 192 cases. A few patients refused to undergo the second stage.

In 14 cases, before 1916, a modified Mosechowitz operation was performed where there was a deep pouch of Douglas, the object being to avoid a recurrent rectocele. Since the adoption of Clark's operation, closure of Douglas' pouch has been found to be unnecessary, and has for the most part been abandoned.

After due consideration of size of family, age, amount of responsibility and work and general physical condition, sterilization, without hysterectomy, was performed on 14 patients.

REASONS FOR NOT OPERATING

Of 80 patients receiving no operative treatment:

- 27 refused operation.
- 19 were considered poor circulatory risks.
- 12 had diabetes.
- 6 were sufficiently relieved by a pessary.
- 4 were evidently pregnant when admitted.
- 4 had colds and did not return for operation.
- 3 were very old.
- 2 were excessively obese.
- 2 had malignant disease.
- 1 had pulmonary tuberculosis.

TREATMENT AND RESULTS

Incomplete plastic operation without laparotomy. Under this heading are included those patients who had either one or two out of the three plastic operations of amputation of the cervix, anterior colporrhaphy and perineorrhaphy. These operations were all performed before 1900. The total number of cases was 15. There were three operative deaths. Seven are untraceable.

	Complete Recurrence	Recurrent Cystocele and Rectocele	Recurrent Cystocele
6 months or less after operation	1		
6 months to 1 year after operation	1		1
1 to 2 years after operation		1	
3 to 5 years after operation		1	
Only two cases may be considered relieved.			

Abdominal operation only. There were 10 patients in this group. Six had hysterectomies performed; 4 had suspensions. Three are untraceable.

	Well	Cystocele and rectocele	Complete re- currence and postoperative hernia
6 months or less after operation	1		
6 months to 1 year after operation		1	
2 to 3 years after operation	2		
3 to 5 years after operation	1		1
5 to 10 years after operation	1		
6 cases may be considered relieved.			

Complete plastic operation without laparotomy. This group includes those cases where either trachelorrhaphy or amputation of the cervix was combined with anterior colporrhaphy and perineorrhaphy. There were thirteen in this group. Vaginal hysterectomy was performed once, trachelorrhaphy four times, and amputation of the cervix eight times. Four patients could not be traced.

	Complete Recurrences	Rectocele	Well
6 months or less after operation	2		2
6 months to 1 year after operation			1
1 to 2 years after operation		1	
3 to 5 years after operation	1		
10 to 15 years after operation			1
15 to 20 years after operation		1	
2 cases may be considered cured and two relieved.			

Incomplete plastic operation and laparotomy. The patients in this group had one or two of the three plastic operations of amputation of the cervix (or trachelorrhaphy) anterior colporrhaphy and perineorrhaphy and in addition a pelvic operation by the abdominal route. There were 192 in this group.

Trachelorrhaphy was performed on 5, amputation of the cervix on 131, supravaginal hysterectomy with modified Olshausen's suspension of the cervical stump on 72, Olshausen's suspension on 62, ventral suspension on 36, supravaginal hysterectomy on 12, Alexander's suspension on 5, Mayo's suspension on 3, Simpson's suspension on 1, and exploratory laparotomy only on 1 (cancer). There were five operative deaths, 2.6 per cent. Forty-six patients could not be traced.

INCOMPLETE PLASTIC OPERATIONS WITH LAPAROTOMY

	COMPLETE RE- CURRENCE	CYSTOCELE AND RECTOCELE	CYSTOCELE	RECTOCELE	CYSTOCELE AND POSTOPERATIVE HERNIA	POSTOPERATIVE HERNIA	WELL
6 months or less after operation	2	6	2	8		1	12
6 months to 1 year after operation	1			4		1	6
1 to 2 years after operation	4		3				9
2 to 3 years after operation				1		1	10
3 to 5 years after operation		1	12	4	1		14
5 to 10 years after operation		1	1	2	1	1	25
10 to 15 years after operation	1	1	1				13
15 to 20 years after operation		1					

One patient with a complete recurrence had gone to work in a factory three months after operation. One patient with a recurrent cystocele and rectocele had had a severe cough before the recurrence was noticed. Eight patients, 5.6 per cent, developed complete recurrences, seven of which occurred before two years had passed. Of those who had complete and partial recurrences (cystocele or rectocele or both) 60 per cent noticed them before two years had passed after operation, while 40 per cent noticed them three to twenty years afterward. Sixty-three per cent of this entire group were anatomically cured when seen from one month to fifteen years after operation and 12 per cent more were cured from three to fifteen years before recurrences were noticed. In a number of instances patients who were symptomatically well were found to have partial recurrences.

Complete Plastic Operation and Laparotomy.—This group comprised 338 patients. Trachelorrhaphy on 32; amputation of the cervix, 304; supravaginal hysterectomy with modified Olshausen's suspension of the cervical stump, 114; Olshausen's suspension, 145; ventral suspension, 38; supravaginal hysterectomy, 28; Alexander's suspension, 6; Mayo's suspension, 3; Simpson's suspension, 1; Baldy's suspension, 1, and complete abdominal hysterectomy, 2. There were six operative deaths, 1.77 per cent. Thirty-four patients could not be traced.

COMPLETE PLASTIC OPERATIONS WITH LAPAROTOMY

	COMPLETE RECURRENCE	CYSTOCELE AND RECTOCELE	CYSTOCELE	RECTOCELE	CYSTOCELE AND POSTOPER- ATIVE HERNIA	COMPLETE RECURRENCE AND POSTOPERATIVE HERNIA	RECTOCELE AND POSTOPERATIVE HERNIA	POSTOPERATIVE HERNIA	WELL
6 months or less after operation	12	3		12			1	1	43
6 months to 1 year after operation	1	12	12	1				1	17
1 to 2 years after operation	1	1	1	12	12	1		1	22
2 to 3 years after operation	1	3	12					1	15
3 to 5 years after operation	12	3	12	3					50
5 to 10 years after operation		3	1	3	1	1		3	48
10 to 15 years after operation	1	1	3					1	31
15 to 20 years after operation		1	12					1	7

Three recurrences (two were complete and one was partial) occurred after sudden physical strain. There were in all in this group, eleven complete recurrences, 3.6 per cent, 5 of which occurred after the three-year interval. There were 45 partial recurrences, 15.1 per cent, many of which were of a moderate degree. Those patients who were cured from one month to twenty years after operation comprised 78.2 per cent of this entire group, while those cured from three to twenty years comprised 58.3 per cent.

Secondary operations.—Thirty-four patients had more than one operation at this clinic for complete or partial recurrence. Eight of these are included among those who became pregnant after operation (see below). The remaining are briefly summarized as follows:

1. (A) Interposition operation. (B) Vaginal hysterectomy six months later for a complete recurrence. (C) Lateral vaginal walls sutured together four months later for complete recurrence.

2. (A) Interposition, perineorrhaphy, and Alexander's suspension. (B) Interposition and perineorrhaphy three months later for complete recurrence. One year later patient had an umbilical and bilateral inguinal hernia.

3. (A) Perineorrhaphy and Alexander's suspension. (B) Amputation of cervix and perineorrhaphy two months afterward for complete recurrence. Untraceable.

4. (A) Vaginal hysterectomy, anterior colporrhaphy, perineorrhaphy, and Alexander's suspension. (B) Anterior colporrhaphy and perineorrhaphy five months later. Untraceable.

5. (A) Amputation of cervix, anterior colporrhaphy, and perineorrhaphy. (B) Perineorrhaphy and ventrofixation one year later for complete recurrence. Rectocele present one year afterward but no worse when seen ten years afterward.

6. (A) Anterior colporrhaphy, perineorrhaphy, Olshausen's suspension. (B) Amputation of cervix and supravaginal hysterectomy with suspension of stump seven years three months later for recurrence. Cured eleven years six months after second operation.

7. (A) Anterior colporrhaphy, perineorrhaphy, and Olshausen's suspension. (B) Perineorrhaphy and Olshausen's suspension eight months later for complete recurrence. Dead, cause unknown, three years three months later.

8. (A) Amputation of cervix, anterior colporrhaphy, perineorrhaphy, Olshausen's suspension, and repair of ventral hernia. (B) Perineorrhaphy, supravaginal hysterectomy with stump suspension, and repair of postoperative hernia eight years later for rectocele and hernia. Cured nine years after second operation.

9. (A) Complete plastic operation, supravaginal hysterectomy with cervical suspension. Complete recurrence four years nine months later. (B) Plastic and suspension of cervix twelve years later. Cured three years after second operation.

10. (A) Complete plastic and Olshausen's suspension. (B) Plastic and hysterectomy with suspension three years later for recurrence. (C) Perineorrhaphy, suspension of cervix, Moschowitz operation and repair of postoperative hernia for complete recurrence five years after second operation. The third operation was followed by a recurrence in less than a year. The patient was alive with a complete recurrence and urinary incontinence ten years after her third operation and 24 years after her first operation.

11. (A) Plastic and suspension, recurrence four months later. (B) Complete plastic and hysterectomy with suspension ten years later. Complete recurrence two years after second operation.

12. (A) Incomplete plastic and suspension. Recurrence and postoperative hernia eight months later. (B) Five years six months later partial plastic, ventrofixation and repair of hernia. Cured three months after second operation.

13. (A) Complete plastic and hysterectomy with suspension. (B) Vaginapexia two years later for complete recurrence. (C) Repair of postoperative hernia three years four months after second operation. Complete recurrence five years nine months after second operation.

14. (A) Partial plastic and hysterectomy. (B) Suspension of cervical stump six months later. Cured thirteen years later.

15. (A) Complete plastic and suspension. Cystocele four years later after cough. (B) Plastic and suspension five years after first operation. Cured one year six months later.

16. (A) Complete plastic and suspension. (B) Perineorrhaphy for recurrent rectocele three years later. Cured twelve years four months later.

17. (A) Complete plastic and suspension. (B) Perineorrhaphy for recurrent rectocele three years later and cured ten years later.

18. (A) Complete plastic and suspension. (B) Perineorrhaphy and ventrofixation nine years later for partial recurrence. Cured four years after second operation.

19. (A) Ventrofixation. (B) Complete plastic, hysterectomy with suspension of cervical stump and repair of postoperative hernia for complete recurrence one year after first operation. Well until death five years after second operation.

20. (A) Complete plastic and hysterectomy with stump suspension. Cystocele and postoperative hernia following cough ten months later. (B) Plastic and repair of hernia one year later. Cured eight years nine months after first operation.

21. (A) Complete operation. (B) Perineorrhaphy ten months later for recurrent rectocele. Cured nine years later.

22. (A) Complete operation. (B) Plastic for recurrent cystocele and rectocele seven years later. Cured three years after second operation.

23. (A) Amputation of cervix and hysterectomy. Cystocele, rectocele, prolapse and postoperative hernia five months later. (B) Complete operation. Cured seven years after second operation.

24. (A) Complete operation. (B) Perineorrhaphy for recurrent rectocele three years four months later. Cured two years three months after second operation.

25. (A) Complete operation. (B) Perineorrhaphy two years later. Cured four years four months later.

26. (A) Complete operation. (B) Plastic and suspension of cervix eleven months later for complete recurrence. Untraceable.

Thus, of this group of 26, three are untraceable, eight were final failures and eighteen, or 69.2 per cent, were final cures.

OPERATIVE MORTALITY

There were fourteen operative deaths out of 603 patients operated upon, or 2.31 per cent. Four were due to embolus (one day, one day, thirteen, and sixteen days after operation); three were due to pneumonia (three, four, and sixteen days after operation); three were due to acute circulatory decompensation (two, two, and three days after operation); two were due to peritonitis and two were due to sepsis (fifteen and thirty days after operation). The average age of this group is 57.2 years which is eight to ten years above the average age for the whole series.

ASSOCIATED PATHOLOGY

Since the cervix in procidentia is outside of the vagina, it is exposed to constant friction with the result that the epithelium becomes thickened and cornified and gives the protruding mass a grayish-white appearance. The cervix also becomes longer and larger as a result of hypertrophy of connective tissue following the edema, congestion drag, torsion, and unusual motion of such a dependent mass. In 22.5 per cent of cases the cervix was ulcerated in one or more places. The ulcers are the result of erosion and infection. They heal slowly unless properly treated. If the mass is pushed back into the vagina and the patient is kept in bed and given daily douches, they heal usually in less than two weeks. Acute infection of the amputated cervix was noted three times microscopically; hypertrophy and chronic cervicitis were diagnosed in practically every amputated cervix. Twenty-seven patients had a cervical polyp. Despite the pregnancies, the instrumental labors, and the irritation; despite the leucoplakia, hypertrophy, impaired circulation and infection, conditions which predispose to carcinoma in the normally located cervix, only one patient of the whole series had carcinoma of the protruding cervix. (This was the only case ever seen at this clinic and the only case seen by any of the staff members in their entire experience.)

One patient had a fibroma of the vulva; two had bleeding hemorrhoids; nine had complete laceration of the perineum and four had a cyst of Bartholin's gland.

Other associated pathologic conditions were as follows:

Uterus: Acute endometritis, 2; chronic endometritis, 18; glandular hyperplasia of the endometrium, 47; chronic metritis, 2; endometrial polyp, 12; adenomyoma, 4; and fibromyoma (single or multiple), 73.

Peritoneal adhesions were found in the pelvis in only 21 cases, 3.6 per cent, and in 9 of these they were due to gross adnexal inflammatory disease.

Fallopian tubes: On microscopic examination subacute salpingitis was diagnosed twice and chronic salpingitis 104 times. No salpingitis isthmica nodosa was noted.

Ovaries: Chronic ovaritis, 38; simple serous cystoma, 8; dermoid cyst, 6; pseudomucinous cystadenoma, 6; fibroma, 5; benign papillary serous cystadenoma, 5 (the cystadenoma was bilateral in three of these cases); endometrioma, 2; malignant papillary serous cystadenoma, 2; and myxoma, 1.

Vermiform appendix: Microscopic diagnosis: Chronic appendicitis, 84; acute, 2; subacute, 2; atrophy and fibrosis of appendix, 22; and carcinoid tumor, 2.

Gall bladder: One patient had a cholecystostomy for stones at the time of operation for procidentia, and five had cholecystectomy for stones at a variable length of time after the procidentia operations.

Malignant disease: One patient had had a breast removed for carcinoma four years before her operation for procidentia. At the time of procidentia operation or exploratory laparotomy two patients had a malignant ovarian cyst, one had advanced peritoneal carcinomatosis, one had carcinoma of the body of the pancreas and one had carcinoma of the protruding cervix. Three other patients had operations for carcinoma of the breast, one, four, and nine years after the procidentia operation.

Thus malignant disease is known to have occurred in nine patients of the whole series, 1.31 per cent, and malignant pelvic disease in only three, 0.43 per cent.

Diabetes: Twelve patients were not operated on because of sugar in their urine. One patient had urinary sugar at the time of operation; one had no sugar at the time of operation but showed it five months later. Two patients had sugar, two and thirteen years after operation, and one died of diabetes seven years five months after operation. Total, 17.

Hernias: Before operation at this clinic three patients had had repair of an inguinal hernia, three had had repair of postoperative hernia and one had had repair of an umbilical hernia. At the time of admission 31 patients had an umbilical hernia (these varied in size from 1 to 15 cm. in greatest diameter), eight had an inguinal hernia, six had postoperative hernia, and one had bilateral femoral hernia. Of the 572 patients in this series who had abdominal operation, 23, or 4.02 per cent, are known to have developed postoperative hernias three months to nine years later. Four of these patients had had the operation of approximation of the abdominal recti.

PREGNANCY AFTER OPERATION

Fourteen of those patients who were traceable became pregnant after operation:

1. *Normal labor one year after a complete operation for procidentia.* Plastic, hysterectomy, and cervical suspension fourteen years later for partial recurrence. Perineorrhaphy, suspension of cervix and repair of postoperative hernia three years six months after second operation. Cured one year after third operation.

2. *Normal labor and complete recurrence one year three months after an incomplete operation.* Then followed another labor and two abortions. Complete plastic and suspension fifteen years five months after first operation. Cured two years four months after second operation.

3. *Abortion at three months one year after a complete plastic and suspension.* No recurrence two years five months later.

4. *Normal labor two years after a complete plastic operation.* Complete operation with hysterectomy and hemorrhoidectomy six years nine months after first

operation. Suspension of cervical stump and approximation of recti one year two months after second operation for slight prolapse and umbilical hernia. Postoperative hernia repaired six months after third operation. Patient complained of incontinence of urine and hemorrhoids but had no recurrence twenty-two years after first operation.

5. *Normal labor three years after a complete plastic and suspension.* No recurrence eleven years two months later.

6. *Incarcerated pregnant uterus resulting in a five-months' miscarriage, a recurrent cystocele and a third degree retroversion* two years two months after a complete plastic, Baldy suspension and shortening of the uterosacral ligaments.

7. *Normal labor and a complete recurrence one year one month after a complete plastic operation and suspension.* Complete operation with hysterectomy four years seven months later. Perineorrhaphy, modified Moschowitz and vaginapexy ten months after second operation for partial recurrence. After third operation pelvic sepsis occurred, drainage was instituted and the patient was finally discharged against advice with a ureteral fistula.

8. *Normal labor one year eleven months after an incomplete plastic and suspension.* Patient well with no recurrence nine months later.

9. *Cesarean section and then a miscarriage after a complete plastic and suspension.* Postoperative hernia five years later. Seven years later a supravaginal hysterectomy was performed and the hernia repaired. The patient was well three years five months after the second operation.

10. *Normal labors one year six months and three years after a complete plastic and suspension.* Patient well twelve years nine months after operation.

11. *Four months' miscarriage one year seven months after amputation of cervix and suspension.* Well nine years after operation.

12. *Six months' miscarriage one year after a complete plastic and suspension.* One year nine months later plastic and suspension for a recurrent cystocele, rectocele and prolapse. Patient was cured five years seven months after second operation.

13. *Normal labor and complete recurrence two years four months after a complete plastic and fixation.* Plastic and hysterectomy three years four months later. Patient was well seven years after second operation.

14. *Cesarean section one year three months and two years eleven months after a complete plastic and suspension.* Abortion at two and a half months, three years eight months after operation. Patient was well six months later.

Thus five patients had normal labors with recurrences, three had normal labors without recurrences, two had cesarean sections, two had miscarriages with recurrence, one had a miscarriage without recurrence, and one had an abortion without recurrence. Twelve were final cures and two were final failures.

DISCUSSION

Not one of the patients in this series was of the negro race. There is a much higher percentage of pelvic inflammation among colored women and procidentia is uncommon among those with pelvic inflammation. Furthermore, the majority of colored women have contracted pelvis which bring the bony supports of the pelvic diaphragm nearer to the points of strain and torsion. In addition it has been very rare at this clinic to see a colored patient with a hernia, which is evidence that colored women have better tissue tone and elasticity.

The occurrence of procidentia in 26 patients who had never been pregnant, and in six who had had only abortions or miscarriages, would indicate that in some instances at least there is a qualitative inferiority of the tissues. In 35 per cent of this series the onset of procidentia was ten or more years after the preceding labor and was associated with tissue atrophy. The partial and complete recurrences after complete and multiple operations cannot all be attributed to inferior technic or sepsis. Furthermore, the occurrence of some form of hernia in 10.98 per cent of the whole series and of postoperative hernia in 4.02 per cent of those having laparotomy at this clinic seem to point to a deficiency of tissue tone. At operation it has been a common experience to note the poor quality of tissues, friable, easily torn vaginal membrane; atrophied levator muscles; friable, greasy subcutaneous abdominal tissue; thin aponeurosis; flat, pale rectus muscles; tenuous peritoneum, and marked atrophy and inelasticity of the uterus and its supports.

In twenty instances operation failed to cure the urinary incontinence, although it brought about relief. In five instances patients complained of urinary incontinence after operation, not having had the trouble before.

One patient died of intestinal obstruction six months after operation.

In calculating results in this report the criteria as to cures and recurrences have been based on the anatomic findings. In many instances, however, patients have been cured symptomatically, but have been found on examination to have a moderate cystocele or a fair sized rectocele. It should be emphasized that the cervix in these cases was well held up. When symptomatic recurrences were complained of, the cervix was found prolapsed.

SUMMARY AND CONCLUSIONS

1. Six hundred and eighty-three cases of marked uterine prolapse, i.e., procidentia, have been studied from many angles, special emphasis being laid on the most effective type of operative treatment as indicated by long time results.
2. The family histories of the patients of this series were not remarkable, the percentages for tuberculosis, 7.6, and for malignant disease, 6.7, being similar to those derived in other studies made at this clinic.
3. The past histories covered a wide range of infectious diseases and operations, of which a complete summary has not been presented. A past history of vaginal repair operation was given by 9.9 per cent of this series, of operation for suspension of the uterus by 3.3 per cent, and of previous operation for procidentia (not at this clinic) by 2.6 per cent.
4. Twenty-six patients had never been pregnant; nineteen of these were unmarried.

5. The percentage of sterility for this series was 1.05.
6. The average number of children among the married patients was 3.92.
7. Symptoms of procidentia did not begin until after the menopause in 27.3 per cent of patients. Of the others 20.9 per cent had some menstrual abnormality, but in no instance was this a major symptom.
8. Normal deliveries were stated to have occurred by 45.3 per cent of patients; 54.7 per cent had had one to nine instrumental deliveries. Seven patients had had one breech delivery; four had given birth to twins. Only two gave a history of toxemia and one of placenta previa.
9. Symptoms of procidentia began (from two weeks to forty-five years) after the patient's first labor in 152 instances, 23.3 per cent of cases.
10. In 48 per cent of patients symptoms began one month to three years after the preceding labor; in 16.6 per cent they began three to ten years later; and in 35 per cent they began from ten to forty-five years afterward.
11. Functional incontinence of urine, usually not marked, was complained of by 31.3 per cent of patients.
12. That a condition of procidentia does not seem to incommode this class of patient seriously is indicated by the fact that 72.5 per cent had had symptoms longer than two years, and 41.2 per cent had tolerated the inconvenience from five to thirty-eight years before resorting to treatment.
13. The procidentia was complete in 14.6 per cent of cases.
14. Eighty patients, 11.7 per cent, received no operative treatment.
15. A study of end-results on the basis of 84.1 per cent of follow-ups shows that in those cases where the incomplete plastic operation and abdominal suspension were performed about 70 per cent were anatomic cures and about 75 per cent were symptomatic cures. When the complete plastic operation and abdominal suspension were performed about 80 per cent resulted in anatomic cures, while about 84 per cent were symptomatically cured. By anatomic cure is meant entire absence of retrocele, cystocele, or prolapse of the cervix below its normal level in the pelvis, as determined by examination. When complete operations were performed no marked difference in results was obtained, whether simple Olshausen suspension, ventrofixation, simple supravaginal hysterectomy, or hysterectomy with fixation of the cervical stump was done, although the results were somewhat better following hysterectomy with cervical stump suspension. Complete recurrences occurred in 3 to 6 per cent of the cases, partial recurrences in about 15 per cent. In cases where two, three, or even four operations were performed there were 69.2 per cent of final cures.

16. The operative mortality was 2.28 per cent. In this group the patients were, on the average, eight to ten years older than the average age for the whole series.

17. Despite apparently predisposing factors only one patient in this series had carcinoma of the cervix. Nine patients in all, 1.31 per cent, are known to have had malignant disease and only three of these had malignant pelvic disease. Good pelvic drainage, with absence of retained, chemically changed, irritating secretions, seems to be the most plausible explanation for this low cancer figure among women of the cancer age.

18. Gross chronic pelvic inflammation was found in only 1.57 per cent of the 572 patients who had abdominal operation. Chronic salpingitis was diagnosed microscopically in 18.1 per cent. No tuberculous salpingitis or salpingitis isthmica nodosa was noted. Benign ovarian tumors were found in 33 patients.

19. Fourteen patients became pregnant one to three times after operation. These pregnancies resulted in twelve babies, three miscarriages and four abortions. Pregnancy after operation resulted in 58.3 per cent of complete recurrences in this small group, whereas two patients underwent cesarean section with a successful outcome.

The writers wish to thank Miss A. R. Hickson, Miss I. C. Manson, and Miss D. I. MacCormick for much valuable assistance.

198 COMMONWEALTH AVE.

DIABETIC COMA COMPLICATING PREGNANCY*

By MAXWELL S. MERRIAM, M.D., BROOKLYN, N. Y.

WHILE innumerable cases of diabetic coma complicating various other conditions have been reported, a careful search of the literature of the past twenty years has yielded the reports of only five cases dealing with diabetic coma complicating pregnancy. The rarity of this condition, therefore, justifies the report of the following case.

Mrs. J. P., aged thirty-six, Italian, housewife, mother of four children, was first seen by me at 3 P.M., December 15, 1925, complaining of abdominal pain and vomiting for the previous six hours. The examination proved negative except for slight indefinite tenderness over both lower quadrants, and the uterus which was the size of a seven months' pregnancy, with vertex presenting, and fetal heart in the lower left quadrant. She had always enjoyed excellent health, her previous pregnancies were normal, and her present pregnancy up to this time was entirely uneventful.

Twelve hours later the pains had become so severe that the patient was advised to enter the United Israel-Zion Hospital. On admission her temperature was 100°, pulse 126, respirations shallow and somewhat labored. In spite of the severe abdominal pains, however, there was no rigidity and but very little tenderness in

*Read at a meeting of the Brooklyn Gynecological Society, May 4, 1928.

both lower quadrants. Urine examination showed a few white blood cells, moderate number of granular and hyaline casts, heavy trace of albumen, 1.1 per cent sugar, and heavy acetone reaction. Blood examination showed erythrocytes 4,200,000, hemoglobin 82 per cent, 26,400 leucocytes, with 82 per cent polymorphonuclears. The blood pressure was 145 systolic and 85 diastolic.

Within a few hours the patient's condition became markedly worse, and she sank into a deep coma. The respirations were deeper and more labored, of the typical Kussmaul type, the breath reeked of acetone odor, the pupils were dilated and reacted sluggishly to light, the mucous membrane of the mouth was parched, the teeth were covered with sordes, and the gums were bleeding. The heart sounds were normal except for the rapid rate. The lungs showed good resonance throughout. At this time, a diagnosis of diabetic coma was made, although the urinary findings and blood pressure suggested a possible renal complication.

The patient was given 1200 c.c. of 5 per cent glucose intravenously, and 40 units of insulin. The blood chemistry showed a blood sugar of 330, alveolar carbon dioxide of 8, urea nitrogen 15, and creatinine 2. Three hours later the patient's condition remained unchanged, and she was given 40 units of insulin intramuscularly, and 1500 c.c. of saline by clysis. Again three hours later she was given 1200 c.c. of 5 per cent glucose intravenously and 40 units of insulin. The alveolar carbon dioxide at this time was 12, the blood sugar was 160, the patient began to rouse somewhat and in two hours was fairly well out of her coma. The rapid and labored respirations however continued; although the pulse and general condition were much improved. In all, the patient had received 120 units of insulin, 2400 c.c. of 5 per cent glucose intravenously, and 1500 c.c. of saline by clysis, before coming out of the coma which lasted twelve hours.

Six hours after awakening from the coma, the patient complained of moderate abdominal pains, and definite uterine contractions could be felt. Within an hour, she delivered herself of a stillborn male fetus, weighing 3 pounds 4 ounces. Insulin was continued in doses of 15 units every three hours.

The following day, the alveolar CO_2 was 20, the blood sugar 235, and the clinical picture showed marked improvement, with the respirations less labored, the pulse 90, and of good quality, and the eyes clear.

From this time on, the patient showed continued improvement and as the amount of acetone and sugar decreased, the dosage of insulin was proportionately reduced. Within two weeks after her admission into the hospital the patient was discharged showing no acetone or sugar in the urine, with a blood sugar of 150 and alveolar CO_2 of 45.

For the first year, following her discharge from the hospital, it was found necessary to give her 15 to 30 units of insulin a day. During the past year, however, her condition has been controlled entirely by diet. At no time does the sugar in the urine exceed 2 per cent, and clinically she is in excellent condition.

COMMENT

It is interesting to note that of the five previously reported cases only one, that reported by Reveno,¹ in 1923, recovered. This patient who had been suffering from diabetes for several years, went into coma during the eighth month of her fifth pregnancy. After twelve hours, during which time she was given 52 units of insulin, she recovered from her coma enough to be roused, but the air-hunger, acetone odor, and high blood sugar persisted. Immediately after spontaneous delivery, however, there was a marked improvement in both her clinical and blood pictures. Reveno brings out the point "that in this respect the abrupt change simulated very closely the response of a patient suffering from one of the toxemias of pregnancy due to either therapeutic or spontaneous abortion."

Of the three cases reported by F. Ueber,² before the use of insulin, two were young women, twenty and twenty-two years of age, both severe diabetics who became worse during their menstrual periods, and who had been advised against both marriage and conception. They went into coma during the fifth and seventh months of their pregnancies, respectively, and in spite of the most rigid dietary treatment, died undelivered. The third, the mother of four children, suffering from an extremely mild diabetes, had a very uneventful pregnancy until her eighth month when she suddenly began to vomit and showed signs of impending coma. A cesarean section was performed, with the delivery of a 4½ pound baby which died of asphyxia twenty-four hours later. Following the section, her condition was the same except for the increasing coma, and she died shortly after.

The fifth case reported by Schottelius,³ a para iv, twenty-nine years of age, in whom diabetes evidently developed during the latter half of this pregnancy as evidenced by thirst, polyuria, and pruritus only at this time began, with headaches and vomiting in her seventh month of pregnancy. She went into coma during which she was delivered by insertion of a bag and deep cervical incisions, followed by a version and extraction of a macerated fetus. The patient died thirty minutes after delivery.

CONCLUSIONS

1. Only two cases, including the one presently reported, in which insulin was used, recovered.
2. Young women with diabetes, especially when aggravated during their menstrual periods, have the worse prognoses.
3. Even very mild diabetics may suddenly go into coma during pregnancy.
4. The use of insulin results in marked improvement immediately after delivery, similar to that noted in toxemias of pregnancy. However, the death of the fetus before delivery makes the prognosis much more grave because while the fetus is alive the fetal pancreas helps the mother in the carbohydrate metabolism.
5. Operative delivery during diabetic coma would seem to have as serious a prognosis as in eclampsia.

REFERENCES

- (1) *Reveno*: J. A. M. A. 81: 2101, December, 1923. (2) *Ueber*: Deutsche Med. Wehnschr. 46: 761, 1921. (3) *Schottelius*: Zentralbl. f. Gynäk., No. 23, 1912.

1270 FORTY-NINTH STREET.

Society Transactions

AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS, AND ABDOMINAL SURGEONS

FORTY-FIRST ANNUAL MEETING

King Edward Hotel, Toronto, Canada, September 10, 11, 12, 1928

Dr. Palmer Findley, of Omaha, presiding. The following papers were presented in the order given:

DR. G. K. DICKINSON, Jersey City, N. J., read a paper entitled **The Liver as It Functions in Operations in the Female Abdomen.***

DR. L. E. PHANEUF, Boston, Mass., read a paper entitled **Complete Lacerations of the Perineum and Their Surgical Treatment.** (See page 475, April issue, for original paper.)

DISCUSSION

DR. JAMES E. SADLIER, Poughkeepsie, N. Y.—It would seem to me, judging from these illustrations, that this is an operation which combines all the necessary details for an essentially good repair of the perineum. There are many and varied methods of repair of complete lacerations of the perineum. Some surgeons perform the operation in one way and some in another, but complete exposure of muscle ends and covering the sutures placed in the sphincter muscle are essential.

I differ with the doctor on one point. I have found for a number of years that through and through sutures in the perineum extending through the skin occasionally will get me in trouble, and hence I have abandoned that method and use only buried sutures with subcutaneous sutures for approximation of skin surfaces.

With reference to the prophylaxis, I am glad to know that in Boston they are seeing less and less of this complication. In New York State where I live and with a considerable knowledge of maternal conditions as they exist at the present time, I am sorry to say that I doubt very much whether there are less and less of these cases in our part of the country. At least I have not so noted in my practice. We have a maternal mortality rate of one death to every one hundred and seventy-one mothers, and that rate has not varied in twelve years; of necessity the morbidity conditions could not be expected to have materially improved. I am not saying this in regard to New York State alone, for the maternal mortality rate in my state is no greater, if as great, as exists in most or all of the states of this country. It seems to me that the prophylaxis and prevention of these terrible injuries should greatly appeal to an organization such as this.

DR. JOHN OSBORN POLAK, Brooklyn, N. Y.—I would like to emphasize a point in regard to prophylaxis. We have found in delivering patients with funnel pelves that the woman with the narrow bi-ischial diameter is the one who is going

*This contribution will appear in full, with discussion, in the current volume of the Transactions of the Association. It was necessary to omit some of the papers read, as well as parts of the discussions, for lack of space.

to rupture the posterior segment and that segment will be ruptured as a rule without injury to the levators if it occurs spontaneously, but if forceps are added there is injury to the levators, fascia and underlying structures. Prevention can be materially aided by preparation of the vulvovaginal orifice and by ironing out of the levators as suggested by Dr. Potter and in addition to this, dilatation of the sphincter ani muscle. After dilatation the sphincter retracts much better than before, and if it is injured, its repair is much more simple.

I have followed almost the same technic as that described by Dr. Phaneuf with the single exception that we have used the thin ends of silkworm gut for rectal sutures. These do not cut or become infected as silk or silk boiled in paraffin. The knots and ends are left long, tied together are brought out through the anus, which relieves the patient of gas and takes care of the drainage. These sutures come out spontaneously.

In an extensive dissection in such a region one is not likely to secure complete hemostasis, consequently I disagree with Dr. Sadlier as to the method of closing the skin. It is better to have fewer sutures and less tension on the skin so as to allow for drainage which always occurs immediately after such a procedure.

DR. CHARLES L. BONIFIELD, CINCINNATI, OHIO.—I rise to discuss the paper only from the standpoint of the secondary operation. For a good many years I have been obtaining equally good results by a much simpler procedure. I dissect the rectum loose, sufficiently high to enable me to pull down the apex of the tear to and through the sphincter. This makes it unnecessary to put stitches of any kind in the rectum. I then proceed to build up the perineum in the usual way. I use catgut exclusively and do not have these patients touched; if douches are given the catgut is apt to give out before the union is firm. In regard to starving a patient, they can go from ten to fifteen days but usually nine or ten days are sufficient.

As to the improvement in obstetrics in the last twenty-five to thirty years there has been marked improvement in one thing, that is we do not see the vesicovaginal fistulas that we used to see, but we do see more or less laceration of the perineum and of the cervix very frequently. I think the greatest cause of these lacerations is that so much obstetrics is done by the general practitioner who begrudges the time spent with the obstetric patient and applies forceps where if nature were given a chance the patient would deliver herself.

DR. F. S. WETHERELL, SYRACUSE, N. Y.—There are two points brought out in Dr. Phaneuf's paper, one of which I want to emphasize and to commend, and the other to question. In the matter of technic of leaving the bowels inactive for at least four to six days, whether it is a perineorrhaphy, or a postoperative abdominal surgical case, I heartily agree. I know from my own experience that following this method my patients are much more comfortable than if enemas are given and other means of purging are used, rather than using morphine to make the patient comfortable in the event of gas pains. Often the bowels will move of their own accord on the third, fourth, or fifth day.

The second point: If the doctor applies Dakin's solution every two hours, then he will get the effect that Dakin's solution is supposed to produce. It is inactive after two hours. He is then bound to have burns of the skin, and he is only adding to the possibility of morbidity of the wound. If the solution is used less than every two hours, water might be used just as well.

DR. IRVING POTTER, BUFFALO, N. Y.—I would like to speak only about the prevention of this condition. I do not know anything about the different methods of repair, but I will call your attention first to a careful study of your case; second, to a careful ironing out, slowly and easily, of the entire vaginal canal

before delivery. Third, I would again call attention to the fact that it is far easier to deliver a large head as an aftercoming head than it is as an oncoming head.

DR. EDWARD SPEIDEL, LOUISVILLE, KY.—As to the preliminaries of the operation, I consider the stretching of the sphincter a very important point. We give liquid petrolatum, a tablespoonful at bedtime for five days and castor oil on the sixth day, also injection of two ounces of liquid petrolatum instead of the olive oil that has been suggested. Then, of course, a limited diet is given in the intervening period in order to make the action of the bowels as soft as possible.

DR. PHANEUF (closing).—As to the question concerning Dakin's douches, I quite agree that water might give the same result. The patient might do perfectly well without douches. I have been in the habit of using a short douche for cleanliness. There is always more or less discharge following operation in the vaginal cavity, and I feel that I am getting better results by keeping those parts clean.

As far as these cases were concerned, I might add that the accidents followed delivery by forceps in practically every instance.

DR. R. R. HUGGINS, Pittsburgh, Pa., read a paper on **Problems Associated With the Cervix**. (For original article, see page 589, April issue.)

DISCUSSION

DR. JAMES E. KING, BUFFALO, N. Y.—It seems a very curious thing that an organ or structure that is as accessible to touch and sight as the cervix should have been so long neglected. About the first indication of any interest in the cervix was in the days of Emmett and Sims when they advocated repair of lacerations and showed the relationship to certain pathologic and clinical states. We have been content to operate on these cervices but gave little consideration to other pathologic states to which they might be subject. Like almost all pathologic processes in other structures we find usually that the basis for pathologic change lies in infection. This is perfectly true of the cervix. Today we recognize various chronic and acute changes that the cervix undergoes following infection and have been able to evaluate the effect of such infection.

One of the questions of importance in regard to cervical infection following labor is whether the infection occurs at the time of labor in a lacerated cervix or whether it occurs at some time subsequently. In considering any infection, in whatever structure, for its understanding we must take into account the lymphatic drainage. There is probably no tissue that has a greater and richer lymphatic distribution than that of the uterus and cervix. About fifty years ago Leopold described the relationship of lymphatic vessels to the cervix and uterus, but we have really paid little attention to this particular subject in relation to infection. Treatment of infected cervices has become standardized today, and none of us, I believe, amputate the cervix for simple infection because we have in cauterization a treatment which is most satisfactory. Personally, I have found no contraindication to its use nor have I seen any ill results from its proper employment. As to amputation of the cervix I believe that it is limited almost entirely to those cases in which the cervix is hypertrophied and where it is removed because of this hypertrophy.

Now just one word which I fear is heresy. I am somewhat reluctant to speak of it, but from my own personal experience I am not convinced that we are justified in considering that malignant change is so commonly the result of an infectious

process or of laceration of the cervix. Of course, in our approach to a diseased cervix it makes little difference, as all diseased or lacerated cervixes should be treated on general principles, but the question as to whether or not such cervixes really contribute so largely to the development of malignant disease is debatable. Personally, I have not been able to convince myself that it is so, and possibly we have been accepting and taking for granted textbook statements passed down through many years.

DR. JOHN OSBORN POLAK, BROOKLYN, N. Y.—In answer to Dr. King's question, many of you may have seen the work which Dr. Graves reported before the British Gynecological Society. To me it was particularly impressive. In his 581 cases of cancer of the cervix treated in the Free Hospital for Women there was definite history of traumatic labor in 96 per cent of the cases, while in 714 women who had had repair by trachelorrhaphy there was an incidence of 7 cases of cancer of the cervix. This to my mind brings out one point, that we have not only the injury but the incidence of infection as the cause of chronic irritation.

I have called attention to the importance of the care of these cases in the early weeks after confinement, for the best work can be done with the cautery in these early erosions. Bonney and others are all convinced that erosion, or infection and erosion, is the precursor of cancer.

One other important point, namely that we will get much better results in plastic work if we follow what our predecessors taught us, i.e., to cure the cervical infection before operation.

DR. GORDON K. DICKINSON, JERSEY CITY, N. J.—I think we should not get in the habit of arguing from a small horizon. We should philosophize from broad statistics. There are two questions to be answered if you are going to say that cancer of the cervix is due to traumatism. One is why is it so very rarely, almost never, that one sees cancer come to the cervix of a proclivous inflamed uterus?

Another observation is that in various institutions and insane asylums cancer of the cervix did not develop in a patient who had come there free from cancer.

DR. ADAM P. LEIGHTON, JR., PORTLAND, MAINE.—It seems a pity that a paper of this kind cannot be put into the hands of the recent graduates in medicine and seniors in our medical schools. I have been a member of the Maine State Board of Registration of Medicine for fourteen years and have been the examiner in obstetrics and gynecology during this time. It is appalling to see the lack of understanding on the part of the recent graduates in regard to the treatment of this particular pathologic condition. At almost every examination I have asked a question concerning the treatment of leucorrhea, and in only a few instances has a recent graduate mentioned cauterization or surgery. They generally speak of simply douching, or a "D. and C.," which is old-time silly treatment. I approve of the treatment of endocervicitis and simple erosions by the cautery but also have had very good results with a Schroeder cervical amputation, and have found no particular difficulty with parturition which followed.

DR. JAMES K. QUIGLEY, ROCHESTER, N. Y.—I wish to comment on what Dr. Leighton has said as to the lack of knowledge on the part of recent graduates in regard to the treatment of endocervicitis. I asked that question at the last State Board examination and the answers received from about 50 per cent of the students were appalling. The cautery was not mentioned by more than 5 per cent.

I have seen stenosis result twice, but never dystocia from the use of the cautery.

DR. JENNINGS LITZENBERG, MINNEAPOLIS, MINN.—I am sorry Dr. King brought up a question which cannot be decided by discussion, that is the doubt

about the cause of cancer, which can only be decided by scientific investigation. I want to cite two authorities on the pathologic conditions of the cervix that certainly justify us in saying that the lacerated, infected cervix is the precursor of cancer. Bloodgood said that a cancer has never been found in healthy tissue. Another authority, W. J. Mayo, says that cancer has never been found where there is not chronic irritation. Those two authorities ought to settle the question as far as we can go. To doubt the cause of cancer is simply to say that we do not know the cause of cancer. That is true, but when the clinicians and pathologists agree that there is always chronic irritation where there is cancer, it certainly justifies us not only in treating these cervixes as Dr. King advocates but also in assuming that it will cause cancer if untreated, until it is decided what the cause of cancer is.

DR. JAMES F. BALDWIN, COLUMBUS, OHIO.—Dr. J. M. Baldy, then of Philadelphia, wrote an article a number of years ago in regard to irritation producing cancer of the cervix. The article was a strong one against the theory of lacerations being the cause of cancer. It was largely statistical and appeared in the proceedings of the American Gynecological Society. I have had so many cases of cancer of the cervix in virgins and in women who though married had never been pregnant and where there was no history or evidence of previous trouble about the cervix, that I have doubted very much whether we could assume logically that there is always a preceding irritation. One patient, a virgin twenty-four years old, had far advanced cancer of the cervix; two others twenty-seven years old, one married but never pregnant.

I have for years urged that in practically all cases in which a hysterectomy is made the cervix should be removed. The importance of this was brought forcibly to my attention a few months ago when I received a letter from a former patient in Cleveland. I had operated upon her eleven years before. She was a school-teacher with all the marks of virginity. There was present a large mass of fibroids and apparently a perfectly healthy cervix, and I did a supravaginal hysterectomy. She later married and her health for several years was absolutely perfect, and then she wrote me she had had for some months a bloody discharge. On receiving her letter I immediately wrote to her to see Dr. Lower, whose name she had mentioned, and to submit to any treatment which he might suggest and at once wrote to the doctor telling him all about the case. A few days later I received from him a report that he had found a hopeless mass of cancer which he was treating with radium. Her case made the thirty-second under my own observation in which cancer had developed in the cervix many years after the original hysterectomy, though very few of them in my own work. The result is that I practically never leave a cervix behind.

It is a mistake to claim that the mortality of complete removal at the hands of a competent surgeon materially, if at all, exceeds the mortality of the incomplete operation. If any operator finds any noticeable difference in mortality, it indicates in my judgment that he has never learned just how to remove the cervix.

DR. JAMES E. DAVIS, ANN ARBOR, MICH.—It seems to me the best biologic statement of the etiology of cancer can be given in these words: that it results from a continuous irritative stimulation without sufficient periods of rest to enable the cell or cells to recuperate to normal.

In regard to the illustrations it would seem that there should be no difficulty in diagnosing some of these slides as not indicative of cancer. When stratified squamous epithelium is isolated from its natural position, if it is to become cancer, it does not show any characteristics of a recessive growth change. If it is going to become cancer, there are appearances of a growth impulse. One can almost

always, I think, without hesitation, if he is an experienced reader of slides, avoid making such a mistake. The infolding of the stratified epithelium to a low position in the basement tissues does not necessarily signify malignancy so long as there is no active growth movement. If the tissue is recessive in appearance, it is benign.

DR. HUGGINS (closing).—Just a word about what Dr. Dickinson has said in regard to prolapse of the uterus. I think the reason why it so seldom happens is because the uterus and the cervix are in better condition hanging outside the vagina than buried deeply within the vagina, perhaps in actual contact with an infected secretion.

In regard to what Dr. Davis has said, these slides do not in any way represent doubtful cases of carcinoma. They were merely examples of how epithelium may be displaced and indicate the possibility of its behavior under different conditions.

DR. I. C. RUBIN, New York City, read (by invitation) a paper on **Uterotubal Insufflation Followed by Pregnancy in 205 Cases Out of a Series of 2000 Cases of Infertility**. (For original article, see page 484, April issue.)

DISCUSSION

DR. W. T. DANNREUTHER, NEW YORK CITY.—In accord with Dr. Rubin's natural modesty he has not stressed one very important point, the necessity of following his technic. Obstetricians and gynecologists regard his work as one of the most valuable contributions presented during recent years. Some men, however, have reported untoward sequelae when Dr. Rubin's recommendations have not been closely followed, and I feel that it is extremely important to adhere to the original technic and apparatus. There have been many modifications of the apparatus and innumerable variations in technic. Personally, I have tried to follow Dr. Rubin's suggestions as they have been made from time to time, and my experience has been free from all unfortunate complications and results.

I have one or two definite impressions about the value of this procedure. One is that the large number of women who become pregnant after transuterine insufflation as contrasted with results from salpingostomy, which I probably did entirely too often before the days of the Rubin test. I have done 22 salpingostomies and have had pregnancy follow only once. On the other hand, I recall two private patients, both over thirty-five years old, one sterile for seven years and the other for eleven years, who became pregnant within sixty days after the employment of the Rubin test.

DR. A. J. RONGY, NEW YORK CITY.—There is no question that the Rubin test helps a great many women who previously have been sterile to become pregnant, and I believe I was one of the first to report this observation in a paper presented before this Association five years ago.

Of course, the trouble with statistics is that they cannot be quite exact. In a paper presented to this Association in 1919 I made an analysis of 1000 cases of primary sterility. That was before the days of the Rubin test. I then reported that a number of patients became pregnant, although no treatment had been given; in other words, the sterility in those cases seemed to be of constitutional origin. This may be permanent or transient in character. That is, the patient may be suffering from infertility temporarily or permanently. Now if women who are not treated become pregnant, naturally our statistics on this subject are not altogether accurate.

Another factor which enters into this calculation is that women who have tendencies to grow fibroids in later life or who have fibroid nodules are more prone

to become pregnant during the fourth decade of life than during the third. This fact should be taken into consideration in all statistical studies of primary sterility in women.

Dr. Rubin spoke of the question of operating for appendicitis on young girls. I believe that this operation in girls is a great factor in causing subsequent sterility particularly in cases that have been drained. I have insufflated a number of women who had had an appendix operation during their childhood or adolescence and found in many cases that the tubes were closed with no evidence of infection.

I agree with Dr. Dannreuther that salpingostomy as a cure for sterility should be abandoned. I have operated on a number of cases for the cure of sterility because of peritubal adhesions, and in only two did I have a cure. I believe that the patient who is given an opportunity for a spontaneous cure has a better chance for the tubes to open than the patient who is operated upon.

DR. G. D. ROYSTON, St. Louis, Mo.—I have insufflated about 255 patients for sterility, and among this number in 75 of the cases it was found that the husband was at fault. Fifty-one of the patients became pregnant, but I did not watch the figures as carefully as Dr. Rubin has done; 253 of these patients were insufflated in the office without untoward results, which speaks for its safety.

I also did other things in addition to the insufflation. I treated the endocervicitis with cautery, corrected the diet, and corrected displacement in some cases. Of the six cases where salpingostomy was done not one conceived. In certain cases of hyperacidity the use of 2 per cent bicarbonate of soda douches was followed by conception when nothing else was done. In two cases stopping the patients from smoking resulted in pregnancy. Whether that had anything to do with it or not I do not know. I think it is important to bear in mind that sterility may be caused by dietetic indiscretions or an overstrain in school during the period of adolescence. I am very positive that this subject of children being overworked at school during the years from thirteen to seventeen years should be looked into and that school work at home should not be given to our growing girls.

DR. WILLIAM A. COVENTRY, DULUTH, MINN.—I have had quite a little experience in inflating tubes with the Rubin technic, and a number of these patients have become pregnant within sixty to eighty days after insufflation. Dr. Rubin says he has only used his graphic method during the last few years, and I would be interested in knowing what percentage of the cases that become pregnant showed a marked drop in the curve. I assume the idea was that there was an obstruction and the tube was opened so that the patient could become pregnant.

DR. ALEXANDER M. CAMPBELL, GRAND RAPIDS, MICH.—I would not like to have the impression go out from this Association that salpingostomy is an entirely futile procedure. I would like to mention the statistics of Dr. Bethel Solomon, who has recently reported a large series in which he achieved 31 per cent of successes following salpingostomy, and I would further mention the fact that Drs. Gellhorn and Kerwin have recently reported fifty cases of salpingostomy in which 25 per cent of the patients became pregnant.

I believe that with the exact methods of determining the patency of the tubes, so wonderfully perfected by Dr. Rubin, and with the addition of the transuterine injection of lipiodol with roentgenography, that gynecologists are now in a position to attempt reparative surgery of the fallopian tubes in selected cases with a considerable hope of the restoration of fertility.

DR. RUBIN (closing).—I feel that the untoward results that Dr. Dannreuther mentioned as having occurred here and there are sometimes unavoidable. There are very few measures, indeed, whether therapeutic or diagnostic, in medicine that are not accompanied to some appreciable degree by hazard and untoward

sequelae. I have sought personally to safeguard this method as well as is humanly possible, and I am very greatly gratified that specialists in gynecology, members of this Association and of the American Gynecological Society, and others who are not so affiliated but who are conscientious and trained workers, have not had bad results.

I have called attention in a paper read in London to two of the first untoward results that I have been able to find out about, and I am convinced that those cases were unfortunate tragedies, absolutely avoidable. They were in the hands of men unqualified to do insufflation.

Regarding salpingostomy, which has been mentioned by practically every speaker, it was my early hope that efforts to reconstruct closed tubes would again be taken up in addition to insufflation and that the technic of salpingostomy might be perfected. I was very much encouraged by the report of Dr. Gellhorn that 25 per cent of his salpingostomies were followed by pregnancy. Dr. Childs of New York has also reported success, and it may be eventually we shall go back to salpingostomies. In my own experience I have had only one case, the wife of a physician in whom the tubes were undoubtedly stenosed as ascertained by several insufflations. I watched her for a year reluctant to do a laparotomy which was finally urged upon me by herself and her husband. I was able to check up the findings of the uterotubal insufflation aided by the kymograph in that case and as one of the slides showed there was a high pressure, 185 to 190 mm. Hg., and then a drop without any fluctuation. This finding indicated that she had adherent tubes, which was proved at the laparotomy. Following the operation a pressure of 110 mm. Hg. was obtained during the insufflation, and two months later pregnancy occurred. That is the only case I have mentioned of therapeutic insufflation in connection with operation.

The great trouble with salpingostomy is, of course, that the tubes seal over rapidly after the operation. It was my hope that through repeated tubal insufflation the tubes might be kept open.

There was an appreciable number of patients in this series who had high pressures, and in these the test was repeated therapeutically. In a number the pressure fell to within normal limits. In every case the pressure was appreciably reduced.

DR. J. W. KENNEDY, Philadelphia, Pa., read a paper entitled **Reactions of the Peritoneum.** (For original article, see page 636.)

DISCUSSION

DR. JAMES F. BALDWIN, COLUMBUS, OHIO.—I believe Dr. Kennedy is correct in his assumption that the increase in mortality of appendectomy and of many other operative procedures is due to the fact that incompetent men operate. A great many general practitioners, I am assured, feel competent to operate upon their appendix cases. A few years ago I was called to a small Ohio city to operate upon a case of appendicitis. The attending physician had invited several of his colleagues to accompany us to the house, and among them was a young man whom I did not know but who seemed to take a deep interest in the operative procedure. It was a pus case, and at its conclusion I gave the attending physician general directions as to the after-treatment and evidently spoke in an optimistic way. The young man referred to got me off to one side and anxiously asked me if I really expected the patient to get well. I assured him that I certainly did, of course barring accidents. His rejoinder was, "Well, mine have all died." I later found that he was trying to do surgery and evidently with unsatisfactory results.

Dr. Ochsner's paper describing what became known as the Ochsner treatment of appendicitis was widely published, and at that time I said its publication would do much more harm than good. Had it been read only by experienced surgeons, it would have done a great deal of good, but general practitioners for whom his address was not intended proceeded to adopt the Ochsner treatment and would delay for several days before sending for a surgeon, by which time there were complications resulting in many fatalities. His treatment is unquestionably, in occasional cases, life-saving, but such cases are exceptional and require the finest possible surgical judgment.

The essayist speaks of intestinal obstruction. Most surgeons, if drainage seems necessary in an appendectomy, put a drain in at the lower end of their incision. This means that the drainage wick or tube almost invariably lies in contact with the small intestine, with the result that in many cases an operation is necessary a few weeks later for intestinal obstruction. I prefer a fairly liberal right rectus incision, and in the exceptional case in which drainage is necessary, I make a stab incision well over to the right through which the drainage wick or tube is pulled from within out, the distal end of the drain being placed at the proper point. Over this the cecum is drawn and the omentum tucked in so that the small intestines are at no point in contact with the drain. The main incision is then closed as usual and intestinal obstruction is obviated.

Inexperienced operators are very apt to assume that the inflammatory lymph which appears when the peritoneum is opened is pus and as a result will sometimes put in several drains, none of which are necessary but only a menace. Such wounds can be closed without drainage, as emphasized a few years ago by Dr. Robert Morris, and with absolute safety to the patient.

DR. KENNEDY (closing).—I want to take this opportunity to pay tribute to one of our Fellows, Dr. Hertzler of Kansas, who has written a work of a thousand pages or more on the peritoneum. It is my opinion that this is one of the most valuable contributions that has been given us. This work is just what one might expect from so able a teacher. Dr. Hertzler has been a histologist, an anatomist and a pathologist and has had a large clinical experience in the broad field of surgery. He has brought forth arguments in the first volume of his work on the peritoneum which sustain my position in a publication made in 1910, namely, that it was not the peritonitis that was the final and fatal dose of toxins in the peritonitis abdomen but that the patient most often received such from the complications of the peritonitis, partial and complete bowel obstruction, distal abscesses, retroperitoneal infection, and so forth.

I find much in Dr. Hertzler's work which sustains the position we take that the reactions of the peritoneum are defensive and not offensive and permit us to do more radical work than is advocated in the present-day teaching.

DR. EDGAR A. VANDER VEER, Albany, N. Y., read a paper on **The Causation, Prevention and Treatment of Postoperative Distention of the Abdomen**. (For original article, see the current volume of the Transactions of the Association.)

DR. W. WAYNE BABCOCK, Philadelphia, Pa., read a paper entitled **The Vaginal Approach for Certain Intraperitoneal Operations**. (For original article, see page 573, April issue.)

DISCUSSION

DR. J. W. KENNEDY, PHILADELPHIA, PA.—If as thorough surgery can be done from below as from above, then the lower route must be chosen. We know

that twenty-five times as many people will die suddenly and tragically from the suprapubic hysterectomy as when the uterus is removed from below. I am unable to account for this but this tragic death rate from the suprapubic hysterectomy has driven us to doing over 95 per cent of our hysterectomies by the vaginal route, clamp method.

In regard to approaching the extrauterine pregnancy by the vaginal route, we have not done so, our work being done through the abdomen. There is no condition which shows such marked depression and extreme collapse that will stand abdominal surgery as well as the extrauterine pregnancy. Surgery seems to be welcomed.

I have always felt that there is a reciprocal relation in the extrauterine pregnancy between shock and intra-abdominal hemorrhage, and the symptoms of the extrauterine pregnancy are those of the shocked patient and not of intra-abdominal hemorrhage. We are all familiar with the comatose, pulseless, blanched patient from extrauterine pregnancy. It is a picture of profound depression. I speak of this reciprocal relation between intra-abdominal hemorrhage and shock to bring out this point. If intra-abdominal hemorrhage dominated the picture, we would have the wild, restless, active, ever-moving patient which is the classical picture of intra-abdominal bleeding, whereas the extreme picture of the extrauterine type is the resigned, quiet, easily nursed patient or that of typical shock.

DR. W. J. DIECKMANN, St. Louis, Mo., read (by invitation) a paper on **The Hepatic Lesion in Eclampsia.** (For original article, see page 454, April issue.)

DISCUSSION

DR. OTTO H. SCHWARZ, St. Louis, Mo.—During the latter months of pregnancy remnants of chorionic villi are constantly entering the blood stream. In order that this material may be broken up certain substances in the blood, most likely the proteolytic enzymes, must act against them. The hepatic lesion in eclampsia is a peripheral necrosis which is due to a coagulation of the blood in the tributaries of the portal vein. As this coagulation does not take place, except in extreme cases of eclampsia, in other parts of the body, it is logical to assume that a substance or substances which shorten the coagulation time are absorbed from the intestinal tract. It is assumed that in pregnancy substances are working against this placental material which is entering the blood stream and, therefore, similar substances which enter the portal circulation in greater concentration are not acted upon quickly enough to prevent this moderate degree of coagulation. Mills has shown that large molecules of protein material can actually be absorbed through the intestines and that the coagulation time in general is markedly shortened after a protein meal. That this shortening of coagulation time should be most marked in the portal system is a logical deduction; therefore, this can be shortened to even a greater degree on account of pregnancy in the human for reasons already stated. The experiments of Dr. Dieckmann have aimed at simulating the condition as it exists in human pregnancy. In this discussion we are only considering the cases of eclampsia which present the hepatic lesion. We believe that this lesion can be produced by substances which are absorbed from the intestinal tract. There may be some cases of eclampsia which have other sources of damaging material than the intestinal tract, such as a degenerating myomatous tumor of the uterus. Such cases would not show the liver lesion. A case of this kind actually came to our attention, and the autopsy findings show a markedly degenerating myoma, no liver lesion, and a typical picture of the kidney in eclampsia. This was a case of marked hypertension in a primipara who

had been in the wards for several weeks with no improvement in her condition. She died after a cesarean section, and the organs were examined at autopsy.

DR. PAUL TITUS, PITTSBURGH, PA.—We must not forget that the origin of eclampsia is a very complex affair. I do not believe that any one specific thing alone can ever be demonstrated as the sole cause of eclampsia.

In connection with this work I would like to raise two questions: Do the authors subscribe to or disagree with the idea that there is a definite distinction between the pathologic lesions of toxemia of early and of late pregnancy; and, in their experimental work, in addition to producing these significant pathologic lesions, were they ever able to cause dogs to have the clinical signs of eclampsia, namely the convulsions?

DR. JAMES E. DAVIS, ANN ARBOR, MICH.—Some years ago a very noted research worker stated that no one was competent to discuss the experimental work of another person until he had gone through the same steps that the experimenter had taken. There is much truth in this statement, therefore one should only ask questions.

The lesion is spoken of as a hemorrhagic type and also as a thrombus. I have not clearly in my mind just what differentiation is made in the pathologic change produced in these two types of lesions. Do both types obtain or is it a dominating hemorrhagic picture? Has any study been made of the walls of the smaller vessels? It is fairly common to find in eclampsia changes in the smaller vessels of the brain, such as minute hemorrhages. It is also a common thing to see hemorrhages in the liver and also in the kidney, as has been mentioned. I am wondering whether the same condition might be produced by the injection of other substances. This brings up the question of the advisability of having different controls.

DR. E. D. PLASS, IOWA CITY, IA.—There are three facts of clinical significance which I think should be always considered in speaking of a new theory on the etiology of eclampsia. Eclampsia occurs in primiparous women or in those who have a multiple pregnancy or hydramnios. I would like to ask the investigators how they are able to correlate their theory of the causation of eclampsia with these facts of clinical incidence?

Reference has been made in the discussion to the fact that there is no such thing as a typical lesion of eclampsia. There is a textbook picture of eclampsia which one occasionally sees, but my own experience has been that the average eclamptic patient who comes to autopsy does not approximate this picture. That being the case, it is, I think, distinctly unwise to look upon the liver lesion as being essentially primary and that would in itself make such liver lesion secondary to some other more far-reaching, perhaps some metabolic, disturbance.

There is one other point I would like to bring out. The investigators have mentioned the possible significance of an overingestion of protein during the latter months of pregnancy as of etiologic importance. It is unnecessary to emphasize that in any condition where there is a lowered protein there is an increased intake of other food materials in order that the patient may have a sufficient calorie intake. It is evident that there must be an increase in the carbohydrate intake as a partial compensation. Moreover, a diet low in protein is a diet high in the inorganic constituents, a fact which may be significant.

DR. HARDING, TORONTO, ONTARIO.—I have listened with profound interest to the description of Dr. Dieckman's and Dr. Schwarz's experimental production of a type of lesion in the liver approximating that found in the so-called classical picture of eclampsia; but, like Dr. Plass, I am not entirely convinced that the

liver picture, as it is usually designated, is so absolutely an essential part of eclampsia. I have not in my own mind been able to separate from what clinical evidence I have seen, into any distinct class the convulsive type and that type of disturbance which is generally known as a preeclampsia. There is little time for observation work in the convulsive type of disturbance; but if we assume that the symptoms of eclampsia and preeclampsia are multiform expressions of one underlying disturbance, I cannot quite see the force of the argument that low protein feeding will act in any prophylactic manner against eclampsia. Prenatal care does, but you cannot disturb the picture of preeclampsia at all by protein feeding. The patient will improve on a high protein diet provided it is salt-free and combined with rest in bed.

DR. DIECKMANN (closing).—In answer to Dr. Titus' question as to the similarity between early and late toxemia of pregnancy, we believe there is no relation between vomiting of pregnancy and eclampsia except that they both occur only in pregnant women. As to convulsions in our animals, I have let none live longer than five days. There are tonic and clonic movements with respiratory difficulty following a lethal injection of tissue extract. As soon as the animals are sick, or at the end of five days I have killed them; for if they were left to die, postmortem changes would set in so rapidly that findings would have no significance.

In regard to the thrombosis and hemorrhage of which Dr. Davis spoke, the primary lesion in eclampsia is a thrombosis in the small capillaries of the portal system followed by hemorrhage with subsequent necrosis. We have not studied any of the other organs. The kidney macroscopically shows some changes.

Answering Dr. Plass, in primiparae and in twin pregnancy there is an increased intrauterine pressure and also an increased intra-abdominal pressure. Also in twins the placental surface is greater. It has been shown that absorption of protein from the intestines varies directly as the intra-abdominal pressure. Dr. Plass also states that certain cases of eclampsia do not show the liver lesion. Schmorl in 71 out of 73 autopsies on women dying from eclampsia was able to find peripheral hemorrhage and necrosis of the liver, some, however, being microscopic. On a number of animals subcapsular hemorrhages could be seen following the first injection. Tissue was removed from one dog at this time and showed the typical peripheral hemorrhage found in eclampsia.

DR. JOHN OSBORN POLAK, Brooklyn, N. Y., read a paper entitled **Surgical Intervention Justifiable in the Treatment of Metrophlebitis and Thrombophlebitis of the Pelvic Veins?** (For original article, see page 467, April issue.)

DISCUSSION

DR. BROOKE BLAND, PHILADELPHIA, PA.—I have long been under the impression that ligation or excision of the parauterine veins was not to be considered a proper measure in general infection originating in the uterus. This idea has been fostered first by the generally unfavorable reports found from time to time in the literature and second because the procedure has never made an appeal to me as a worth-while operation. I am unable to understand how a general septic process with virulent streptococci circulating in the blood stream would be modified by ligating or excising the broad ligament veins, an operation by no means easy and, I should say, inevitably more or less incomplete. To me it seems physically impossible by the technic in vogue to ligate or excise successfully all the broad ligament veins, unless the broad ligament itself were severed from its

free margin to the very depths of the pelvic diaphragm. Even with such a radical measure I would still remain skeptical as to whether all the infected thrombi were adequately cared for.

Pelvic phlebectomy has never proved an alluring procedure to me nor has any other form of pelvic surgery in widespread blood-stream infection, and I assume that all these cases are associated with more or less bacteremia. So far as I have been able to determine a passive policy seems to accomplish more than any form of operative interference thus far advocated and practiced.

DR. JENNINGS LITZENBERG, MINNEAPOLIS, MINN.—Dr. Polak's conservative position is exactly that which we have taken at the University of Minnesota, for we have done no operations in these cases for a number of years.

The papers which have been presented upon this subject advocating operation are the best arguments that I can present against them.

We have in Dr. Polak's paper a crystallization of the modern ideas on this subject harmonizing the clinical and pathologic aspects which lead to the same inevitable conclusions that pathologically operation would appear to be unsound and in his own clinic his results with conservative treatment condemn the operation.

DR. ASA B. DAVIS, NEW YORK CITY.—I have no definite statistics to offer but have had some experience which confirms what Dr. Polak has said. In our Lying-In service since 1890 we have taken care of, in round numbers, over 160,000 deliveries. I have been in rather close touch with the service during that time. In this number of cases, drawn from tenement districts, from midwives, from incompetent and unfortunate doctors, we have had our share of septic cases and of thrombophlebitis of the pelvic veins. We have learned to avoid any interference or operations in these latter cases. We place them in the solarium, give them good nursing and such food as they can take, and evacuate collections of pus if they appear. In late years we have found that small blood transfusions repeated at a week or ten-day interval have been decidedly helpful. This does not cure all these cases, but undoubtedly some that would otherwise die are saved in this way. Professor Trendelenberg was among the first to operate for this condition many years ago. According to my recollection he reported three cases. I have never been able to determine the time when one should operate or the indications which one must find, and I was unsuccessful in my attempts to gain light upon these points from him. He explained that he had done these operations rather as an experiment and was not certain as to their value. In the analogous operation upon the jugular vein as a complication of otitis media, the site of operation is accessible. We cannot safely reopen the abdomen if things go wrong. Some years ago Dr. James A. Harrar of the Lying-In Hospital staff treated a small series of these cases with magnesium sulphate solution. In this small number, too few to draw definite conclusions from, there was no apparent outstanding benefit from the treatment.

DR. R. R. HUGGINS, PITTSBURGH, PA.—Two years ago I reported a small series of cases of puerperal thrombophlebitis in which we performed ligation of the veins. I tried to make it clear at that time that it was done under stress and where the prognosis was extremely bad, and I also tried to make it clear that it was purely a contribution to that particular kind of surgery and not done with a closed mind.

We have gotten one thing out of this discussion on the operative treatment of thrombophlebitis, namely that we are really beginning to make an effort at diagnosis and these clinical symptoms give us some aid. Occasionally we find a case where there is marked tenderness along the ovarian vein and perhaps tenderness in the broad ligament, as Dr. Williams originally suggested, which aids in making a

diagnosis. It is then up to the surgeon to determine upon the treatment. I fully recognize the fact that the vast majority of these cases are certainly better simply with palliative treatment.

DR. JAMES F. BALDWIN, COLUMBUS, OHIO.—I have never approved of simple ligation in cases of thrombophlebitis. It has seemed to me to be bad surgery to dissect up and ligate the ovarian vein at its entrance into the vena cava or renal vein; but instead of that the vein should be cut across in the pelvis without ligation and allowed to drain into a gauze fluff which passes out through the vagina, the fluff itself being covered by the sigmoid which has been swung around and attached at the brim of the pelvis.

The article which I wrote some years ago on this subject was prepared with the utmost care. I went back over all my records and reported in brief detail 67 consecutive cases of puerperal infection upon which I had operated. In the examination of these infected cases it is bad surgery to manipulate unnecessarily the pelvic tissues, but to remove the uterus with its infected sinuses and let the infected veins drain is in many of these cases a wise procedure. Before completing that article I sent printed copies of what I had prepared to surgeons in Europe and this country who had written upon this subject, including, of course, a number of members of this Association, and without a single exception they all seemed to favor that line of treatment. In that paper I referred to a paper by Dr. C. Jeff Miller of New Orleans, in which he reported a number of cases in which ligation of veins had been made with the saving of about 60 per cent. In my paper I divided, for practical purposes, puerperal infections into five classes, and infected thrombophlebitis was placed with a number of other conditions in class 5, in which class I advised as a general procedure panhysterectomy with vaginal drainage.

Since that paper was published, I have had a number of other cases and with equally satisfactory results. Three of those cases I have had within the past few months.

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Cases of puerperal sepsis should have the very best possible attention. These cases should not be left for history-taking and examination to internes or even assistants, but should be cared for by the specialist himself. A careful study of each case, careful weighing of symptoms, a bimanual examination, and of chief importance careful study of the history of the patient, should enable one to make a correct diagnosis. I have never been able to feel those "worm-like masses" mentioned by Dr. Williams, but I have no doubt they occasionally occur. In one case which I reported I found high up back of the cervix a very tender little mass which I thought was a small abscess in the posterior wall of the uterus. At operation I found this abscess but in addition a second abscess higher up that I had not been able to feel. That patient promptly recovered.

DR. POLAK (closing).—I do not believe that we should confuse this question of puerperal infection. Endometritis, perimetritis and thrombophlebitis are distinct pathologic entities. Unfortunately they run into one another and are not so clean cut clinically as the textbook would give us to understand.

I have gone over Dr. Baldwin's cases and am convinced that a large number of them got well. He operated on cases that I, personally, would not have operated upon, and from the symptomatology I do not think Dr. Baldwin can say positively that some of these women would not have gotten well without surgery.

There is a pathologic and a biologic defense in every case of thrombophlebitis which is identical with the defense which we get in a case of endometritis which gets well by drainage and uterine contraction and being let alone. However,

manipulation will disturb thrombophlebitis far more than it will disturb endometritis. Furthermore, when the vessel is blocked, as it is in the majority of instances, ligation does not help.

The Doctor has spoken of hysterectomy. He does a hysterectomy and leaves the veins open and drains the pelvis. Most of the cases he has cited have reached the stage of peritonitis, and he has been doing what any good surgeon would do who had his dexterity.

DR. L. A. CALKINS, University of Virginia, read by invitation a paper on **Factors Governing Blood Loss in the Third Stage of Labor.** (For original article, see page 578, April issue.)

DISCUSSION

DR. A. H. BILL, CLEVELAND, OHIO.—It seems to me that as a general thing excessive loss of blood during the third stage of labor may be seen in two groups of cases: first, those with relaxation of the uterus, failure to contract; second, those with laceration of the cervix. In regard to the latter, for the most part we may say that excessive bleeding or hemorrhage due to laceration of the cervix is seen only in those cases in which the pernicious practice is followed of trying to deliver the child before complete dilatation of the cervix or of performing manual dilatation. It is seldom that unusual loss of blood is seen when the first stage of labor has taken its natural course.

In regard to relaxation, I believe that prolonged second stage of labor, due to some obstruction which may be corrected, such as faulty position, is undoubtedly a cause of excessive bleeding and should be corrected early in the second stage of labor.

There is no question but that anesthesia prevents contraction of the uterus. This is not an argument against anesthetics, but it is an argument for taking unusual precautions where anesthetics are used. I have used anesthetics to the utmost degree but certain precautions have been taken to offset their relaxing effect. We are very careful in head presentations to stop the anesthetic just as soon as the head of the child is born. In cases of version the anesthetic is removed as soon as the feet of the child are brought down because with the complete relaxation needed for version further anesthesia is not needed to finish the delivery. In addition to this I have used routinely for the last twelve or thirteen years the administration of pituitrin immediately following the birth of the child.

In cases of antepartum hemorrhage there is undoubtedly a predisposition to excessive loss of blood in the third stage of labor. I would again suggest the importance of foreseeing this and in such cases fortifying the patient by a prophylactic transfusion.

I cannot agree with those who forbid placing a hand on the fundus during the third stage of labor. I believe it is important to keep a hand on the fundus because it is the only way in which we know whether the uterus is contracted and whether to further stimulate it.

DR. EDWARD SPEIDEL, LOUISVILLE, KY.—I would like to learn from the essayist the exact method used in conducting the third stage of labor, as this is important for an understanding of the figures presented. After having tried all the short cuts for the conduct of the third stage of labor that were ever published I have now returned to a very simple method. After the baby is born I watch the fundus by placing my hand near the umbilicus so as not to interfere with the natural elongation and expulsion of the placenta, as shown by Williams, and then wait twenty minutes by the clock, and in most instances the placenta comes away easily.

I have, of course, tried pituitrin for hastening the third stage of labor, administering it after the birth of the child, and by the time I reached home there would be more hemorrhage and I would have to return to the hospital. In other words, there is a sudden expulsion of the placenta, a sudden retraction of the uterus and then naturally a relaxation following and more hemorrhage. Consequently I have now returned to one of the old methods of conducting this stage and find it very satisfactory.

DR. CALKINS (closing).—Dr. Bill made reference to the long second stage of labor as a factor in blood loss. From my figures I think it is safe to say that that is not an important factor. The second stage may be long or it may be short, and the blood loss is not materially affected.

The anesthetic is a very important factor, for an anesthetic poorly given may do more harm than good. The proper management of the third stage is the most important factor of all.

Dr. Speidel asked what technic we employed. That does not make any difference as far as the paper is concerned. My paper would hold for any technic, consistently used on each and every case. However, it is very simple and is as follows: The anesthetic is stopped as soon as possible. We are careful that the patient gets a considerable quantity of oxygen and let her wake up as soon as possible after the baby is born. We use pituitrin immediately on delivery of the placenta. We keep our hand on the fundus, not at the umbilicus, from the moment the baby is born until we are sure the bleeding has stopped and is not likely to start again.

DR. FRED L. ADAIR, Minneapolis, Minn., (by invitation) read a paper entitled **Infection in the Puerperium, With Analysis of 8000 Cases.** (For original article, see page 559, April issue.)

DISCUSSION

DR. MAGNUS A. TATE, CINCINNATI, OHIO.—Puerperal infection and streptococcal infections are most timely subjects to bring before a society like this, because we are in the dark on so many of their important phases. While we have reduced the incidence to puerperal infection by rigid asepsis, it is apt to occur in our institutions and in certain localities. I think the careful analysis of this situation at Sloane was most important, showing the care taken and the deductions drawn from the study of these cases are valuable. For instance, there was an increased leucocytosis, polymorphonuclears running up to 84, hemoglobin 71 per cent, and it was found that the blood cultures and smears from the vagina showed in many of the cases the *Streptococcus hemolyticus*. They also found at autopsy a violent infection in the abdomen, with much fluid and here and there a rupture of an abscess.

I have thought for many years that there must be some peculiar immunity in many women, in fact in most women, otherwise how can we account for cases that go along receiving much trauma, in labor many hours, and still remain absolutely free from infection?

To those who are doing obstetrics the question of treatment is important. What shall we do in cases of puerperal infection? We have gone through the usual routine of treatment; we use serum with surprising results in a few cases, but in most cases it is rather disappointing. Lately we have been using mereurochrome, and I must say with also disappointing results. Outside of treating our patients symptomatically, I have found that very large doses of quinine have given the best results. In a personal discussion with Dr. Pantzer some years ago he asked me if I had tried salicylate of soda. During the past four years in the cases that I have

seen, especially of the *Streptococcus hemolyticus*, I give the serum first, but I also give forty grains of quinine by mouth and 100 grains of salicylate of soda per rectum and repeat that in half doses in twelve to twenty-four hours; and my results, I believe, justify the continuance of this treatment.

DR. ARTHUR J. SKEEL, CLEVELAND, OHIO.—I believe we have all been satisfied, for the last few years at any rate, that the matter of the introduction of bacteria has had too much stress laid upon it and there has been insufficient attention paid to the study of immunity.

In the study of fever during the puerperium we must first eliminate the non-puerperal infections. A breast abscess is not puerperal infection in the sense that it has anything to do with labor. The abscessed jaw due to an infected tooth has nothing to do with labor, neither has appendicitis occurring in the puerperium.

Our infection rate has dropped strikingly since the adoption of forceps control and free use of episiotomy. A doctor who puts on a pair of sterile gloves, handles the labia and perineum during delivery and then invades the genital tract for repair with the same pair of gloves is guilty of faulty technic.

The free use of episiotomy not only avoids lacerations, but more important still it prevents pressure necrosis. I am convinced that prolonged pressure any place in the genital tract by the hard fetal head produces pressure necrosis and consequent destruction of the local immunity to infection. No matter how good the cervix, vagina and perineum, there are plenty of atria for infections. It is not necessary to have a two inch tear to determine infection. The thing that determines whether there will be infection, granted the presence of pathogenic bacteria, is the amount of pressure necrosis produced during the labor and not the size of the tear.

After eliminating the accidents that may have to do with the conduct of labor and careless technic, we still have left cases about which we have been so much mystified. I want to make two suggestions. I think the study which Dr. Adair suggested of skin immunity, the Dick test, is very important because it includes not only the patients who have had scarlet fever but also those who naturally are immune. A study of the skin reaction would cover both the inherited and acquired immunities of this type. If further study of this subject proves that the relationship exists between scarlet fever and these streptococcal puerperal infections, we should derive therefrom some therapeutic aid. In treating such cases by transfusion, we should select as donors Dick test immunes, with the hope of injecting with the blood whatever it is that gives the donor immunity.

DR. HERBERT M. LITTLE, MONTREAL, CANADA.—I am inclined to agree with Young that trauma is indeed a neglected but most important feature. It is well known that the results of repair after episiotomy are better than were the results of repair of perineum damaged by pressure on an arrested head, and it is not too much to assume that the excellent results reported by DeLee in cases where the second stage of labor is shortened are due not only to the lessened pressure, lessened trauma in the second stage, but also, and this is a most important factor, to prevention of the vitiation of the patient's resistance by fatigue. A patient returned from labor room to ward with a pulse between 70 and 80 has a much better prognosis than one with pulse ranging between 100 and 120.

What are we going to do about it? In the first place there must be a sufficiently definite clinical investigation to determine the nature of the infecting agents, then, so far as the delivery was concerned, how many people were associated in the conduct of the labor; was a forceps applied if so when; how long had the patient been in the second stage? Was the uterus subject to manipulation after rupture of the membranes, with the certainty of smearing organisms in the posterior fornix over those membranes and so allowing them access to the uterine cavity? Most important, what was the conduct of the third stage? Were any attempts made at

expression of the placenta before it evidently completely separated? Another simple question might be, was the perineum repaired during or after the third stage and were swabs placed in the vagina during the repair? Naturally after episiotomies the sutures are laid after the birth of the child before the placenta separated, and the uterus is left severely alone lest resultant hemorrhage make the repair more difficult.

I cannot accept the English view that cases delivered with forceps are more liable to infection than those delivered spontaneously. When the application of forceps is feared or discouraged, the patient eventually subjected to forceps will undergo operation at a time when those two most important factors, fatigue and trauma, are at their maximum. While not advocating in any way the unnecessary use of obstetric forceps, I would like to have the statistics of many of those teachers who, while preaching conservatism, really practice active interference for the relief of pain without fear of infection in the belief that active handling is, in the long run, less dangerous to the mother and to the child than a long, unduly protracted so-called spontaneous labor.

DR. HENRY W. SCHOENECK, SYRACUSE, N. Y.—While it is true that we may find an occasional puerperal infection occurring after a labor unattended by many vaginal examinations or operative interference, it is my belief that the less one interferes with the delivery the less likelihood there will be for the development of a puerperal infection. This observation would seem to be substantiated by a study of morbidity rates in some 500 cases of hospital deliveries. In addition to an aseptic technic practiced, tincture of iodine was used externally at the time of delivery. In these cases the morbidity rate, indicated by a temperature of 100° F. or more, taken by mouth, occurring on two successive days between the second and fourteenth days, increased with the application of forceps; the more difficult the operation (with version, introduction of bags, and with lacerations of the cervix and the perineum), the higher the morbidity.

May I mention here the results obtained by the use of acriflavine in 250 cases. This dye was instilled into the vagina at the time the patient entered the hospital in labor. It was applied externally, also, at the time of delivery. The general morbidity rate was reduced to the figure of 1.7. We found, however, that the morbidity rate here, as in the first series mentioned, was increased by operative interference.

If these observations mean anything at all, they would seem to justify what I said in the beginning, that is, the liability to puerperal infection increases with the practice of interference with the delivery of the patient.

DR. WILLIAM A. SCOTT, TORONTO, ONT.—I quite agree with the remarks of the last two speakers, that as far as the general profession is concerned the hope of reducing the number of cases of fever in the puerperium lies in careful technic and minimum operative interference and that when interference is necessary it be carried out at the proper time. However, in spite of our improvements in technic and the most painstaking care and greatest obstetric skill possible, there still remains a small number of cases.

During the last three years we have been making some investigations here along somewhat the same line, although we started from the standpoint of therapeutics rather than from the standpoint of etiology. In the fatal cases, for all practical purposes, the streptococcus is the organism with which we are concerned. When considering morbidity the infection is often not due to the streptococcus, but when the latter is present it is not the *Streptococcus hemolyticus*. Therefore, we started to take routine smears from the cervix of all patients in the antenatal clinic with the idea of determining how many of these were harboring in their cervixes

the hemolytic streptococcus. Figures have not been published yet, but the number of cases in which the organism was present before confinement was exceedingly small, about 5 or 6 cases.

The next point in our investigation was to determine the sensitiveness of patients to streptococcus by the skin test, and then to check these patients up with their postpartum convalescence. There we encountered some exceedingly interesting results. We have only to progress one step further to reach the stage that Dr. Adair has suggested. It is quite probable that an immunity can be established, such as is established in children for scarlet fever, which is of very short duration, but it will take the patient through her pregnancy and puerperium.

The next step was to attempt what has been tried many times before, to develop a serum, which we did from a hemolytic streptococcus recovered from some of our patients in an unfortunate epidemic that we had. That serum was used first only in cases in which the hemolytic streptococcus was recovered from the blood. We knew the type of case with which we were dealing, and our results were so satisfactory that we then attempted to use the same serum in cases where the patient was seriously ill, where there was no local lesion but where we could not obtain a growth on blood culture, and again our results were satisfactory enough to encourage us. That serum ran out and while we were attempting to produce a new serum we found it was quite like if not identical to the scarlet fever serum. We used the latter and could find no difference in results, so at the present time we are using in these cases a scarlet fever serum, giving 40 c.c. intravenously and 50 c.c. subcutaneously and repeating the dose when necessary only in an intramuscular manner.

We have not advised the use of the serum except where there were facilities for the proper investigation and diagnosis of the case, but we feel that it is of decided value in all cases of puerperal infection due to the streptococcus, whether the infection be a septicemia or not.

DR. A. H. BILL, CLEVELAND, OHIO.—I should like to make a comment upon the question of operative interference which has been brought up. A short time ago Dr. Reycraft, an associate, studied a series of cases from the standpoint of morbidity. One series covered five years, more than ten years ago, when comparatively little operative interference was used and more cases were delivered spontaneously. Then he completed another series covering five years during which period more operative interference was used in the way of early correction of abnormalities of position, low forceps, etc., and he found that the morbidity in these two series was practically identical. In other words, there was no more morbidity during the period when with proper technic more operative work was done than during the period covered by the first series.

In compiling statistics of puerperal infection very little mention is made of the isolation of the obstetric pavilion. Are these statistics taken from separate maternity hospitals or hospitals in which the maternity pavilion is absolutely isolated from the rest of the hospital, or are they taken from the maternity ward of a general hospital in which there is an interchange between the various divisions? I think that has a very decided bearing upon the question of infection.

DR. ADAIR (closing).—Dr. Little brought out an important point with reference to proper technic. The importance of an aseptic technic and of preventing trauma is so well established that it does not warrant any dispute. I am not advocating any laxity in this regard but rather an extension of proper technic or efforts to minimize trauma. The main point I wish to bring out is that in spite of our best care in technic and most careful efforts to minimize trauma we still have considerable trouble with puerperal sepsis and infection with the streptococcus even in our best institutions. This paper is the result of an effort to find out whether or not

we might improve some of these conditions, especially in hospital practice, by increasing the resistance of the patient. In this analysis of cases I was trying to find out whether or not there was any particular difference with reference to the cases with or without scarlet fever, not necessarily with the idea that the streptococcus of scarlet fever was identical with the organisms that are connected with the fatal cases of septicemia but more particularly with the idea that the patients who had had scarlet fever might establish a sort of group immunity to the streptococcal type of organism.

We also carried out some skin sensitization tests to determine whether or not there was less resistance among those who are skin sensitive to the streptococcus. Burt White from similar observation concludes that women who react to this test are more apt to develop infection than others.

We are contemplating carrying out a series of parallel cases in which we will have immunization in one-half of the number and nonimmunization to the streptococcus in the other half in order to see whether or not we can effect the incidence of streptococcal infection.

DR. PAUL TITUS, Pittsburgh, Pa., read a paper entitled **Disturbances in Carbohydrate Metabolism in Toxemia of Pregnancy.** (For original article, see page 553, April issue.)

DISCUSSION

DR. E. D. PLASS, IOWA CITY, IA.—I believe that Dr. Titus' attempt to correlate his ideas of carbohydrate deficiency with the criteria laid down by Williams is excellent. It so happens that practically any theory of eclampsia may be partially correlated with those criteria, but there has not yet been a theory developed that satisfies the criteria in all respects. It is always necessary to slide over some of the very essential facts. For example, Dr. Titus was forced to pass over completely the fact that 75 per cent of the cases occur in primiparous women, since he has no explanation for that fact of incidence. Moreover, he explained the incidence of hydramnios on the basis of the enlarged placenta in that condition. My experience has not been that the placenta is essentially enlarged in the ordinary case of hydramnios. He explains the edema as incident to an acute nephritis. My experience with the pathology of eclampsia is to the effect that there is no acute nephritis. There is a transient cloudy swelling of the kidney cells which cannot be classified pathologically as an acute nephritis. Consequently the explanation of the edema cannot be one of acute nephritis. As a matter of fact, Zangemeister has pointed out a sequence in the development of preeclampsia which it is well to bear in mind. He says that the initial lesion is the edema, that there is a change in the hydrophilic proteins of the body which makes them grasp water and they become hydropic; that secondary to that change there is an increase in blood pressure which is quite essential. If the resistance in the peripheral circulation is increased by a large amount of fluid in the tissues, a hypertension becomes absolutely essential. So far the argument is good. Zangemeister has been able to show that the earliest possible sign that we have clinically of an impending toxemia is increase in weight, in other words edema. Remember that an edema has to amount to something like ten pounds in an average-sized individual before it becomes appreciable clinically, except through weighing of the patient.

Zangemeister then goes on to say that the albuminuria, which is the third stage in the development of the syndrome, is incident to the increased fluid content of the kidney. Dr. Titus emphasizes the fact that milk diet is high in carbohydrate. It is almost impossible to get any patient to take more than 3000 c.c. of milk in

a day. That, with 4 per cent sugar, gives a patient 120 grams of carbohydrate as a maximum. I am sure he would not consider that a sufficient carbohydrate intake in a patient threatened with eclampsia.

DR. OTTO H. SCHWARZ, ST. LOUIS, MO.—The figures of Dr. Titus regarding the blood sugar values in relation to convulsions of eclampsia, showing that they fluctuate markedly, are very interesting. We have not taken blood sugars in this way and, therefore, are not in a position to speak of his observation. However, I feel that this fluctuation is not necessarily due to a glycogen depletion. It is well known that the glycogen stores of pregnant women are drained more when near term than at any other time. That is due to the fact that the fetus must develop its nutrition chiefly from carbohydrates of the maternal blood. Real depletion of glycogen is accompanied by marked fatty infiltration of the liver. I do not believe that autopsy study shows that the liver of eclampsia is associated with marked glycogen depletion. Early vomiting of pregnancy has usually associated with it a marked ketosis and glycogen depletion. In extreme cases the liver at autopsy always shows at least a marked fatty infiltration. As an illustration of the marked demand on the glycogen stores in pregnancy, I reported studies on a case of hyperthyroidism in pregnancy about two years ago. In this case after ingestion of sugar the blood sugar, after the initial rise, would drop down as low as 0.05 per cent. This does not occur, so far as I know, in ordinary hyperthyroidism or in pregnancy alone, but the combination of the two conditions brings about marked depletion of the glycogen stores. It is assumed in this case that the insulin of the pancreas was stimulated by the ingestion of sugar and was produced in greater amount than necessary for the handling of the carbohydrate available.

DR. TITUS (closing).—The likelihood of eclampsia occurring more often in primiparae than in multiparae is apparent for at least one very good reason. There are far more primiparae than multiparae in the world because every woman who has a child must once be a primipara but not every other mother becomes a multipara. Moreover, if a woman once adapts herself to the demands of a pregnancy, she ought to be able more readily to do so again; the first trial might be expected to be the crucial test. I purposely avoided discussing this, however, because it is so easy to use the same statistics for opposing arguments.

If Dr. Plass thinks I was explaining the edema of eclampsia as being due to acute nephritis, he misunderstood me. What I said was that in any nephritis, edema is now considered to be a protective measure. Therefore, its presence in eclampsia might logically be expected to afford us a more favorable prognosis.

Nor was it I who said that a milk diet was beneficial. That was Dr. Williams. I merely explained why it was not harmful.

In connection with Dr. Schwarz's comments I have some significant findings to offer. We have a study of preeclampsies now under way in our hospital which shows low blood sugar readings to be a frequent occurrence. In one recent case the report on the blood sugar was too low to read. Dr. Hofbauer has shown that there is a relationship between glycogen depletion of the liver and the extent of any liver lesions in pregnancy.

DR. J. C. LITZENBERG, Minneapolis, Minn., read a paper on **The Relation of Metabolism to Gestation**. (For original article, see page 550, April issue.)

DISCUSSION

DR. PAUL TITUS, PITTSBURGH, PA.—I am inclined to favor the views of Dr. Litzenberg over those expressed by Dr. Speidel in his discussion. It would seem

reasonable to think of obesity and endocrine disturbance as being closely related or interdependent. Would we not expect increase in weight to have a background of lowered metabolism? Dr. Litzenberg has considered this subject in the broadest sense, in that he has discussed sterility as including both infertility and repeated abortions.

DR. F. S. WETHERELL, SYRACUSE, N. Y.—For a long time I have been following a case to which I would like to call attention and of which I spoke before this Association several years ago, at which time I was adjudged to have some serious flights of fancy. In 1915 I was consulted by a young man, who was very anxious that his wife should have a child. This young man had, in the two years previous to seeing me, become quite obese. We were not doing basal metabolic rates at that time. Dr. Lespinasse of Chicago had mentioned the use of thyroid extract for the purpose of affecting the spermatozoa. Having found this patient's spermatozoa immobile, entirely empirically I gave him some thyroid extract. About four months after that he asked me to examine a young woman whom he had picked up in his ear and who was accusing him of being the father of her unborn child. On examination of the man's spermatozoa they were found to be very active and numerous. Two years later this young man reported that they had a very nice baby a year and a half old at home. It might be very interesting in these cases when studying the spermatozoa also to make a study of the metabolic rates and to administer thyroid extract not only to the woman but also to the man in the event that he is the offending party.

DR. WILLIAM A. COVENTRY, DULUTH, MINN.—I would like to ask Dr. Litzenberg if these cases are followed up after giving the thyroid treatment, if examination is made at a later period to see whether the rate has been increased? We went through a series of follow-ups in thyroidectomies and found that in the cases of hypothyroidism with less than minus ten we were not able to increase that rate by giving thyroid tablets.

DR. GORDON K. DICKINSON, JERSEY CITY, N. J.—I should like to ask Dr. Litzenberg whether he thinks there is any relation between the thyroid condition and the sterility?

DR. W. R. COOKE, GALVESTON, TEXAS.—While I have not the actual figures with me in a much smaller series of cases, Dr. Litzenberg's findings have been borne out in my own work. We have had a number of cases in which sterility was apparently relieved by giving patients thyroid extract, and these patients usually showed a low metabolic rate.

In regard to the abortions, I am inclined to think that hyperthyroidism is more often a cause of abortion than we have thought. I have had four cases of abortion in patients who had never been able to carry the pregnancy beyond the given time who were relieved by thyroid treatment. One was not entirely relieved, but she was carried past the point at which she usually miscarried; treatment was stopped, and she aborted within another month or two.

I am inclined to think this condition is due to some specific reaction between the thyroid and ovary and not to the abnormal metabolism per se.

DR. LITZENBERG (closing).—It has been said that no man has a right to interpret research work unless he is skeptical. I have tried in every way to disprove rather than to prove our work but the conclusion is forced upon us that our results demand that a basal metabolism of sterile women be taken, that it also be taken on all women who abort. The metabolic rate will be an indication of some condition behind it such as hyperthyroidism. Just what the relation is between the

thyroid and ovary we do not know, but we do know that there is some relation. We should investigate the other conditions which may reduce the basal metabolism, such as starvation, overwork, etc.

One of my first cases in this work was a woman who was a teacher, who married a professor and who was a research worker herself, hence greatly interested in our studies scientifically as well as personally. She had been married she thought too long without having children. She was apparently in perfect health, but I insisted upon her having a complete physical examination. A low basal metabolic rate was found. These women with a moderately low basal metabolic rate are usually apparently in a state of good health; it is only the reproductive cells that are affected. She was given thyroid, her basal metabolic rate restored to normal, and she conceived in a short time. I thought this was a coincidence, but two years later she desired another baby and, her basal metabolic rate being minus 18, she was put on the treatment and promptly conceived again. The third time she came in pregnant without treatment. She asked if iodized salt on her table would have anything to do with her condition. Her basal metabolic rate was normal at this time. Upon taking the iodized salt away from her table the metabolic rate went down to below normal within four weeks. Subsequently she conceived again after restoration of her metabolism to normal.

DR. PALMER FINDLEY, Omaha, Nebraska, read the president's annual address: **The Teaching of Obstetrics**. (For original article see 16: 611, November, 1928.)

DR. F. H. FALLS, Chicago, Ill., read a paper on **Hyperthyroidism Complicating Pregnancy**. (For original article, see page 536, April issue.)

DISCUSSION

DR ROBERT D. MUSSEY, ROCHESTER, MINN.—Dr. Falls's paper is especially timely because disease of the thyroid gland seems to be gradually increasing, particularly where it is endemic, as in the Great Lakes region and along the West Coast. Hyperthyroidism lowers the incidence of pregnancy about 25 per cent. Exophthalmic goiter or hyperthyroidism in adenomatous goiter rarely develops during pregnancy. In the Mayo Clinic approximately 70 pregnant women have been observed with hyperthyroidism, due to either exophthalmic goiter or adenomatous goiter. The course of the disease of the thyroid gland was not greatly influenced by pregnancy nor were the complications of pregnancy greatly increased by the disease. The incidence of miscarriages was not high (about 6 per cent), and the frequency seemed to be the same whether the patient was treated surgically or by expectant measures.

Dr. Falls mentioned that it was not wise to use iodine indiscriminately during pregnancy. There has been a tendency toward the use of iodine in all pregnancies. In certain cases it may be of value in preventing the development of colloid goiter and in the treatment of hyperthyroidism. However, in the presence of thyroid enlargement it must be used with care, especially if the patients are more than twenty-five years old and may have nonpalpable adenomas within a colloid goiter. There is evidence to suggest that iodine may cause adenomas to hyperfunctionate.

The treatment of hyperthyroidism during pregnancy in the Mayo Clinic differs a little from that outlined by Dr. Falls. The use of compound solution of iodine should be of benefit in all mild cases of exophthalmic goiter complicating pregnancy; but its use, except for a short period of time, is contraindicated in adenomatous goiter with hyperthyroidism. If hyperthyroidism is severe and associated

with marked loss of weight and a high metabolic rate, we believe it is better to control the condition temporarily by the use of compound solution of iodine in the preparation of the patient for partial thyroidectomy. One may be treading on dangerous ground in trying to tide the patient over until the termination of pregnancy. If the patient is near term or if the condition is mild, she may be carried through until after confinement. If patients are operated on during pregnancy, they need not remain in the hospital during the remainder of pregnancy as they will be greatly improved and can be carried through to the normal termination of pregnancy. Eight to ten drops of compound solution of iodine are given daily following the operation.

In reviewing the literature one finds a number of reports of cases in which it has been thought necessary to interrupt pregnancy for the relief of hyperthyroidism. I have not found this necessary; in fact, any operation performed on the patient in the exophthalmic stage is likely to cause a crisis of the hyperthyroidism. Therapeutic abortion is a dangerous operation, I believe it is better to control the condition by the use of compound solution of iodine and perform partial thyroidectomy later if it is considered necessary.

DR. E. P. SLOAN, BLOOMINGTON, ILL.—Our experience has been a little different from that of the previous speaker. We have seen 152 cases of goiter complicating pregnancy in the later stages that were treated medically without operation. Of that number 19 died and I think the majority of the others sustained some definite cardiac damage. During the same period of time 396 goiter operations were performed on patients who were pregnant. Only 42 of these were typical exophthalmic goiters and of those 42 about 20 had been married a considerable length of time and became pregnant just after the thyrotoxic symptoms developed. There were 352 cases of adenoma; 29 of these were toxic adenomas in which the symptoms of the toxemia were similar to those of Graves' disease. One type of toxemia in toxic adenoma is the result of hyperplasia in different areas of the gland outside the adenoma. This type differs in no wise in course and symptoms, and its response to iodine is the same as that in typical exophthalmic goiter. In Europe this kind of toxic adenoma is called secondary Basedow's disease.

The other kind of toxic adenoma is the result of absorption of degenerated products from a broken down or degenerated area within the adenoma. Of the latter type there were 152. Symptoms of this variety of toxemia are quite similar to that of an anaphylactic reaction from absorption of foreign proteid. This type of toxemia probably occurs a little oftener in the late months of pregnancy; 64 of these had a minus basal metabolism.

The metabolic rate is always higher during pregnancy. The terms plus and minus are misleading. The normal amount of oxygen consumption for that particular patient should be determined and called 100. The amount actually consumed should be stated in decimals of that norm. Thus minus 10 should be called 90; 20 plus should be called 120. To the other considerations that are used in arriving at the normal standard, or 100, should be added the stage of pregnancy. I am not aware of any one having worked out the normal rise of metabolism for each month of pregnancy.

There were 173 nontoxic cases operated upon for relief from pressure symptoms, and 164 of the 173 had shown rapid growth since pregnancy occurred. In 109 there were severe cardiac disturbances. Forty-six had intrathoracic goiter.

Of 152 toxic adenoma cases with toxemia from absorption of degenerative products of the broken down adenomas there were 38 definite cases that the condition was so severe that they were emergencies. There were no abortions and no deaths in any of these 396 operated cases.

It seems to us that the indication for operation rests not so much on the degree of thyrotoxicosis as it does upon the condition of the heart and circulatory system.

The pregnant woman with goiter sometimes dies from the effects of the cardiac disturbance, and the reason for operation is relief from a cardiac disturbance that nearly always becomes progressively worse during the course of the pregnancy. The patient who has a toxic goiter and goes through a pregnancy, rarely if ever has as good a circulatory mechanism as she had before.

We believe that every real goiter case seen before the fourth month should be operated upon unless there are strong contraindications. From the fourth to the sixth month strong indications are required to justify operation. From the sixth to the ninth month operation should be done only in dire emergency.

DR. WILLIAM A. COVENTRY, DULUTH, MINN.—I come from a goiter belt also, and our experience has been that quite a number of cases show symptoms very suggestive of toxic goiter during the first two or three months of pregnancy. If the surgeon happens to see the case before the obstetrician does, he is sorely tempted to operate because the symptoms simulate very closely those of a toxic goiter. Fortunately the obstetrician usually sees these patients also and stops the operation because most of these patients in our experience have been young women who have married, kept on with the work that they were pursuing before marriage, planning to save money to buy a home, and were not quite prepared to have a baby at this time. Upon finding that they are pregnant, they immediately go into a chain of symptoms that simulate very closely those of a toxic goiter. They may even have an increase in their metabolic rate.

We have not operated on patients who present symptoms of toxic goiter during the first three months. We have noticed that if we get them to the third month, and institute the Forsheim method of treatment they get along very well after the third month and usually no medical treatment is necessary.

DR. FALLS (closing).—The treatment by operation or by medical management it seems to me depends somewhat on the degree of intoxication. I believe, as Dr. Coventry has said, that in the early months of pregnancy when thyroid symptoms are marked the surgeon who sees these cases would be tempted to operate upon them. We have had four such patients, none of whom were operated upon. They went through their pregnancies to term and delivered normally. One was invalided and was kept in bed during the last half of the pregnancy. I do not know how severe the thyroid symptoms would have become if we had not kept her in bed. She did not show any tendency to abort and one of her babies is living and normal. The other twin would be the same except an accidental cerebral hemorrhage was acquired during delivery. The fact remains, however, that when these cases are treated surgically they do abort. Both in the Mayo series and Percy-Seed series some of the fetuses were aborted following operation on the thyroid. My series is too small to draw any definite conclusions, although it would seem that since there were no abortions and the mothers all did well that medical management should be given proper recognition in the treatment of those cases.

One purpose of this paper is to encourage the accumulation of more statistics along this line.

The normal basal metabolic rate has been found to be increased in pregnancy; a plus or minus 10 is given as the limits of normalcy for nonpregnant individuals. During pregnancy the rate increases to plus or minus 20. I have felt that anything under 30 might be considered normal. However, if the reading is found to be above 30 we should consider that a pathologically increased rate.

We found no glycosuria although we were on the lookout for it. I do not know why. It seemed probable that we should encounter glycosuria along with other evidences of disturbance of the thyroid function. It may be that our series was too small to have included this complication.

DR. A. M. MENDENHALL, Indianapolis, Ind., read a paper entitled **The Teaching of Operative Obstetrics**. (For original article, see page 583, April issue.)

DISCUSSION

DR. JOHN O. POLAK, BROOKLYN, N. Y.—This paper is of interest to me because Dr. Mendenhall has taken the position I have always opposed. I do not believe we are justified in teaching operative surgery to the undergraduate, neither are we justified in teaching operative obstetrics beyond a certain point. At the Long Island Medical School we have, by cajoling and flattering our physiologist into the belief that there is such a thing as physiologic obstetrics, succeeded in getting the third trimester of the sophomore year for the physiology of obstetrics. This time is entirely devoted to manikin instruction in diagnosis and the physiology of pregnancy and the mechanism of labor as we believe it should be taught so far as one basic principle is concerned, namely, that nature is competent normally to effect delivery and that there is no operative procedure justifiable until the passages are thoroughly opened by the physiologic processes. We have insisted upon that and have finally gotten some results.

In the third year our students have a manikin course given on the method of version, breech extraction and the application of forceps. That is where I believe the limit should be. I believe every graduate should be trained in doing version and in low forceps and in breech extraction. There is no such thing as high forceps operation. The slogan "Don't pull, you guide, she pushes," is basic in breech extraction.

The next important point is that the usual hospital residence of four weeks for the undergraduate is altogether too short a time, for he should have eight weeks, or the same time allotted to surgery. We can only accommodate our men for four weeks' residence in obstetrics. They work in the outpatient and prenatal clinics, which gives them opportunity for diagnosis, the recognition of contracted pelvis, and dystocia. We try to impress upon them that when there is a condition of dystocia they must have help, or if they have not help they must depend upon their own resources. Although our men are getting from 20 to 70 cases, we feel that they are going out incompetent if we compare their training to the midwife training that is given in Europe where the midwife delivers a minimum of 200 cases. The most we can do is to give them a thorough manikin training, perhaps one low forceps application under guidance, and a relatively long training in diagnosis and indications. My personal feeling is that no man is competent to do obstetrics outside of low forceps and breech extraction who has not had a hospital residence. An interne training of three months or six months is too short. It is only at the end of a year that our men actually recognize conditions and show good judgment, and that is the reason we have established a four years' residency. It is unfortunate that the majority of these young men would rather starve in the city than go into the country districts. The only thing that teachers of obstetrics can do, as far as I can see, is to teach these men the physiology of labor, to recognize the cervix when it is dilated and never under any circumstances to apply forceps or do a breech extraction until it is absolutely necessary.

DR. L. A. CALKINS, CHARLOTTESVILLE, VA.—I am going to reiterate some of the things that Dr. Polak has just said, perhaps in a little different way. My idea of teaching obstetrics has been that if we emphasize the physiology of obstetrics we have done the best we can do for our undergraduates; on the pathologic side, if we teach them the indications, and more particularly the contraindications for operation, that is about as far as we can go. If we attempt to give more operative obstetrics than breech presentation, forceps, and version, we will put in the mind of

the student an undue emphasis on the operative side, something which we have all been trying to avoid. I believe in our limited curriculum we will have to be satisfied with this small amount of operative teaching.

Dr. Polak said there was no such thing as a high forceps operation. Perhaps there is not in Brooklyn, but there is south of the Mason-Dixon Line, and we have considerable difficulty in impressing upon our students that it is a relic of the dark ages.

DR. M. P. RUCKER, RICHMOND, VA.—What Dr. Mendenhall and Dr. Polak have said is entirely true from the standpoint that we cannot in our teaching of obstetrics tell students exactly what to do in any given case. They may know what to do generally but when confronted with the particular patient they have not sufficient judgment. The mechanism of labor and later on the use of forceps can be taught on the manikin, but that does not equip the student to apply forceps on the patient.

I would like to see one or two things done. We must teach the public that an M.D. degree does not qualify a man to practice obstetrics, or we must give our graduates some further instruction in obstetrics, not necessarily operative obstetrics, but clinical instruction so that they will recognize these cases of dystocia without having to look in a textbook to memorize how to control them. It is rather useless to turn a man out of the medical school with a lot of rules in the back of his head who will not know when he looks at a patient what her condition is. I think the important thing is to agree before we consent to graduate a man that he shall be given a practical examination so that he will know when the cervix is dilated.

DR. WILLIAM T. MCCONNELL, LOUISVILLE, KY. (guest).—The subject of obstetrics has been held on such a low plane by both the laity and the profession that the recent graduate is expected to be able to do all ordinary obstetric operations. It seems to me that under these circumstances it is difficult for him to refuse to do these operations, and so he does them with the result that the gynecologic surgeon reaps a rich harvest later from these patients. Therefore, it devolves upon us who are teaching this subject to impress upon these students very profoundly that operative obstetrics is a serious and a difficult procedure, that it should not be undertaken by men who are not equipped to do this work.

I, personally, am glad to notice that in our section of the country operative obstetrics is coming more and more to be considered a surgical proposition. It is very difficult for men with the training that we now give to become proficient in forceps operations. They can see the operation and yet not know how to do it because we are working in a hidden field. The only way to become skillful is to do the operation under supervision.

DR. JAMES E. DAVIS, ANN ARBOR, MICH.—One side of this subject has not been sufficiently emphasized, namely that there is a problem here in pedagogical economics. When one looks at the different curricula of Class A schools one finds there are unnecessary repetitions in different subjects; one teacher repeats what another one has taught or could teach better. One finds in almost all schools that there is seldom a dean who will take the time and trouble to go about through the different departments of his school to learn where economy of time might be secured. Attention was called in one of the letters quoted by Dr. Findley to the fact that too much time was given to pathology. All are aware that the pathologist can and should teach much of the pathology of obstetrics. It does not follow that the pathologist fulfils this duty, but I do not see how one who is teaching general pathology should escape from giving a great deal of attention to the pathology of obstetrics. Neither should the teacher of physiology escape from giving a great deal of attention to the physiology of obstetrics. It seems to me that before we

secure an adequate remedy for what we have been talking about at great length this problem must be directed to the deans of the schools in order to get a proper adjustment of the attention to be given by the different teaching members of the faculty. If that is properly done the problem resolves itself into one of a sufficient number of hours for clinical attention to the subject.

There are so many hospitals where the obstetric service is very large. In Detroit we have no less than three hospitals with over 100 obstetric cases per month, sufficient to give each student more than 100 cases in a short period of time.

DR. A. J. RONGY, NEW YORK CITY.—We were told by Dr. Sadlier yesterday that in New York one out of 171 women die as a result of childbirth. I have discussed this problem for many years, and it seems to me that the solution does not lie entirely in the teaching of obstetrics in undergraduate schools. No matter how much we teach these men we will not make obstetricians of them. I think the fault lies chiefly in the hospital system in this country. I am at present engaged in helping to draw up plans for a new hospital. When I made a plea for a larger obstetric service, I had difficulty in convincing the board of managers that the obstetric department is as important as the medical or surgical. I was finally able to influence them to give at least 20 per cent of the hospital beds to the obstetric service. When we realize that most of the large hospitals throughout the country afford no opportunity for their intern staffs to be trained in practical obstetrics, we possibly can account for the incompetency that prevails in this branch of medicine. I think this Association should undertake a campaign of education for the establishment of an obstetric department in every large hospital, so that the young physicians may be better trained in this field of work. In that way the morbidity and mortality associated with childbirth will be reduced to a large extent. I believe we should urge the American Hospital Association to take up this important question.

DR. MENDENHALL (closing).—I believe the only difference between Dr. Polak and myself is the question of inflection. His opening remarks would seem to indicate that we were differing in our opinions upon this subject, but we are not. I am happy to say that I have followed Dr. Polak's methods for a great many years and have planned my own accordingly. I would like to read the last sentence of my paper: "Shall we continue this unsatisfactory training, or shall we avoid all attempt at teaching major obstetric surgery to the undergraduate and compel him to obtain this training later?" I am reminded very much of my last lecture by Dr. deSchweinitz. He said "You are not ophthalmologists. I hope I have taught you a little ophthalmology and a little diagnosis." I feel that in obstetrics we are allowing our students to go out and do obstetric surgery whether they are properly trained or not. I agree with Dr. Polak absolutely. Under our present conditions we had better ignore the teaching of operative obstetrics entirely unless we can teach it more thoroughly and more completely than we are now doing. In Indiana we are making comparatively little effort to teach operative obstetrics.

Dr. Polak said that students have little opportunity to do a forceps delivery. That is true in many schools of America. We have not done the high forceps operation in the University of Indiana for eight years.

Economy of time was mentioned. All the departments want more time, of course. It is our duty to impress upon the deans of our schools the relative importance of obstetrics. Dr. Davis' remarks might be somewhat misleading. He spoke of the opportunity of students to *see* 150 cases of obstetrics per month. That is what I am talking against, for *seeing* these cases does not make the student an obstetrician. We can *show* them plenty of cases but they do not have the opportunity to take care of the work themselves.

DR. JAMES K. QUIGLEY, ROCHESTER, N. Y., read a paper entitled **A Study of 165 Consecutive Cesarean Sections Including a Comparison Between 104 Classical Operations and 61 Laparotrachelotomies.** (For original article, see page 597, April issue.)

DISCUSSION

DR. LOUIS E. PHANEUF, BOSTON, MASS.—I have personally performed 306 cervical cesarean sections, including 220 with the longitudinal incision, and 86 with transverse incision. In this group 119 operations were performed on 50 women or 69 repeated cervical sections as follows: 37 women had two operations; 8 had three operations; 4 had four operations; and one had five operations.

The repeated cervical cesarean sections followed the longitudinal incision in 67 cases and the transverse incision in 2 cases. In addition a low classical cesarean section was performed on a woman who had had four previous cervical cesareans, the first three with longitudinal incision and the fourth with a transverse incision.

All the cervical scars were found perfectly healed with the exception of two. In the first a previous cervical cesarean section with a longitudinal incision had been performed; at the time of the second operation she had been in labor eleven hours, and a weak spot was found in the upper part of the scar where the previous incision had encroached upon the body of the uterus; that portion of the incision which had been placed in the cervix was perfectly healed.

In the case of the second patient four cervical cesarean sections had been performed, the first three with the longitudinal incision and the fourth with a transverse incision; at the fifth operation, which was done at the appointed time, without labor, a thinned-out scar was found, so that the bladder was not separated and a low classical section was performed.

In the few weak scars reported the weak spot was found in the part of the incision which was in the body. I thought sometime ago that if the scar were placed entirely within the cervix better results might be obtained. For this reason I have used a transverse cervical incision in my last 86 cases. It is too early to say what the future of this scar may be, but it is possible that by placing the scar entirely in the cervix and preventing encroachment upon the body better results, as far as rupture is concerned, may be obtained.

DR. WILLIAM A. SCOTT, TORONTO, ONT.—For the last four years I have used the low section exclusively. During that time the only classical section that I have done was upon a patient with an acute pulmonary edema where the patient had to be put in a nearly upright position in order to administer the anesthetic. My cases during that time, numbering about 50, have included at least a half dozen patients upon whom I would not have dared do the old classical section, and I would undoubtedly have sacrificed most if not all of the babies without the low section. The first great advantage of this operation is the fact that it increases the operability. That is proved by the fact that in these cases mentioned a classical section would have been contraindicated. Three of these patients subsequently developed pelvic infection in the cellular tissue and had extraperitoneal collections of pus evacuated through the anterior fornix. I feel certain that if they had had a classical section instead of an extraperitoneal infection they would have had an intraperitoneal infection which would most likely have been fatal.

A point in the technic that the previous speaker touched upon is exceedingly important. If we are going to do a low section, it should be a low section and not one that is half and half. So frequently one sees illustrations of a so-called low section in which the incision is deliberately extended above the limit of the true low section. It extends up into the body of the uterus. The patient must be in a

Trendelenberg position to some extent, and I think the incision should never extend above the natural attachment of the bladder. That means that the incision will be carried well down behind the pubes and that the extraction of the child is somewhat more difficult.

The great advantage of making the incision at such a low level is the fact that when one comes to close it after closing the incision in the uterine wall, which is exceedingly thin, one finds a very definite layer of fascia which can be closed as a separate layer. As one goes above that area this fascia disappears, and attempts to bring another layer over means that one is simply using the wall of the uterus. This fascia is one of the most essential factors in holding the infection and helping to keep it extraperitoneal. If the infection goes through the stitch-holes that have closed the uterine wall, then it is further retarded by this dense layer of fascia. I also feel that in that particular area one gets a better healed scar than if the incision is run up somewhat higher. I think it makes very little difference whether the incision is transverse or longitudinal as long as it is kept at that low level.

I might say that in this series of cases there has not been a death, in spite of the fact that in some the classical section would have been contraindicated.

DR. IRVING POTTER, BUFFALO, N. Y.—I cannot say anything about the low section because I have only done it a half dozen times. I have had to do the high section following the low section done by others a number of times, and I have not been pleased with the findings in those cases. My experience with cesarean section covers a series of over 1500 cases personally performed. Those have mostly been high sections, I mean by that, above the umbilicus. There were not many where the incision was partly below the umbilicus.

I feel that we have been too much afraid of the so-called potentially infected uterus or the so-called potentially infected case, and I am not so sure that this low two flap operation is such an easy thing to do. Reports come to me from various men who have done a number of these cases bearing the history of experienced operators working for from 1 to 1½ hours to stop the bleeding. To my mind that is not an operation of choice. A woman who is potentially infected should not be on the table an hour and a half to have hemorrhage stopped which can be avoided at the high operation by packing the uterus from above. I do that routinely now, although formerly only in the placenta previa cases; I now pack it with a strip of 10 per cent iodoform gauze of three or four thicknesses 3 fingers in width and 15 inches long, and leave it in the uterus, not pushing it through the cervix but putting it down in the lower uterine portion and closing the incision. The gauze is removed through the vagina during the second day. That insures complete drainage of these so-called potentially infected cases. It also establishes a leucocytic wall which is of great value. We close the uterus with 2 continuous sutures in the muscle and one in the uterine peritoneum and then put pituitrin in the body of the uterus and a pint of a 5 per cent solution of glucose into the peritoneal cavity. Before the patient is out of the anesthetic she is given 500 c.c. of 5 per cent glucose solution under the breast.

I have a maternal mortality of less than 2 per cent that covers a series of clean and of infected cases. There is a maternal mortality in everything connected with obstetrics.

So far as the rupture of the scar is concerned I have a series of 15 cases that followed the high operation, with one death.

I have done a number of high operations following the low section which had been done by other operators and found very extensive adhesions. Adhesions of the omentum sometimes follow the high operation but they are not bad. Another thing, with a high operation the abdomen can be explored, the uterus looked at, and I think the danger is not so great, the loss of blood is less and the results are good.

DR. A. J. RONGY, NEW YORK, N. Y.—Ten or twelve years ago we became excited about extraperitoneal cesarean section, and it was considered an ideal operation for infected cases. I then said that 90 per cent of extraperitoneal operations became intraperitoneal before the operation was completed, and I refused to perform it. Now we have the cervical operation, and I daresay that five or ten years from now we will not hear a word about it. The cervical operation is done in supposedly infected cases upon women who have been in labor and are exhausted, or upon those on whom an attempt at delivery by forceps has been made. Instead of doing a quick operation, which takes from fifteen to twenty minutes, the so-called classical operation, we subject the patient to an operation that takes at least three times as long. In addition we create a wound area by separating the peritoneum above and below, and if there are any bacteria, they have a place where they can develop.

I have never performed a low cervical cesarean section, but I have watched it done by many competent men. It took them three times as long to do it as it would have taken to do the classical cesarean section; the bleeding was greater, and the patient was not in as good a condition after the operation.

In a badly infected case I put a drain in the lower angle of the wound as I would drain any infected condition.

DR. JOHN OSBORN POLAK, BROOKLYN, N. Y.—I wish to call attention to a suggestion of Dr. Potter's of placing gauze in the uterus. I disagree with him as to how it acts. Placing of gauze in the uterus stimulates contraction and develops better protection in the basal endometrium. It does not drain the uterus after the first few hours but acts as a tampon. I have seen it left in for six weeks although it usually comes out spontaneously in twenty-four hours.

The other point is in regard to the incision in the uterus. Dr. Phaneuf would lead us to suppose that the transverse incision was the one of choice. The transverse incision is to be applied particularly to the patient who has been in labor, a long time not in the elective case. Most of us are doing low sections on our elective cases for the reason that there is a definitely lower mortality, irrespective of Dr. Potter's statement. In 1800 cases collected in Brooklyn the mortality following classical section ran from 3 per cent to 9 per cent in the elective cases, 6 to 14 per cent after the membranes were ruptured and manipulation had occurred. In that same city the mortality in the low section, done by many operators, ran down to 1 per cent. There is no question that there is some advantage in the low section, and while the technic is condemned by those who have not tried it, it is not a difficult technic.

DR. JAMES W. KENNEDY, PHILADELPHIA, PA.—Regarding cesarean section in the infected uterus, we have never endorsed any of the flap splitting operations. We take the position that in the infected uterus, which is a true wound infection, the patient does not receive the final dose of toxins from the peritonitis but from the continued infection as a retroperitoneal one. Therefore we do not approve the flap splitting or extraperitoneal procedure which necessitates opening up and exposing the retroperitoneal space. This is rich in absorbents and has no protective elements such as the peritoneum has.

In other words, I would rather have pus on the peritoneal surface than I would in the retroperitoneal space. We will come into our own when we realize that the peritonitis is not most often the cause of final and fatal dose of toxins from intra-abdominal infections. We do the simple classical cesarean section, as this has the fewest units of trauma and can be done most quickly. I feel that the low incision is all right in the infected uterus as the body of the uterus or cervix is not so thick at such location and is the proper position for suture drainage.

We use through and through sutures, silk in the uterus and through and through sutures in the abdominal wall, as these have many advantages from the standpoint of drainage.

DR. QUIGLEY (closing).—I should not discuss the transverse incision because I have never done one, but it occurs to me that there would be more hemorrhage laterally. As to the question of leaving gauze in the uterus, I regard it as a pack rather than a drain. I have not seen the increased hemorrhage spoken of. I have had but 63 cases, but other men who have done this operation upon large series of cases have not reported increased hemorrhage. If this condition follows the operation, I think poor technic is at fault. Also if it takes an hour and a half to do the operation, that operator has no business to do it. I cannot do a classical section in ten minutes, but think I have done well to do it in eighteen or twenty minutes. I believe thirty minutes should be the limit. In the cases of peritonitis following the classical section I think the trouble is seepage through the wound that is not protected.

I have seen adhesions in a few cases, but I do not find as many as following classical section. I have had no difficulty in making two flaps in a subsequent operation.

DR. CHARLES W. MOOTS, Toledo, Ohio, read a paper entitled **Importance of Urography in the Interpretation of All Obscure Abdominal and Pelvic Cases**. (For original article, see the current volume of the Transactions of the Association.)

Symposium on Radiotherapy in Pelvic Disorders

DR. P. BROOKE BLAND, Philadelphia, Pa., read a paper on **Pyometra Following Radium Therapy for Uterine Cancer**. (For original article, see page 528, April issue.)

DR. PERCY W. TOOMBS, Memphis, Tenn., read a paper on **The Effects of X-ray and Radium Upon the Fetus in Utero**. (For original article, see page 516, April issue.)

DR. W. T. DANNREUTHER, New York, N. Y., read a paper on **Radiotherapy in the Treatment of Cancer of the Cervix**. (For original article, see page 524, April issue.)

DR. R. D. MUSSEY, Rochester, Minn., read a paper on **Radium in the Treatment of Menorrhagia of Adolescence and of the Menopause**. (For original article, see page 502, April issue.)

DR. F. A. CLELAND, Toronto, Canada, read a paper entitled **The Radium Treatment of Fibroids and Fibrosis Uteri**. (For original article, see page 508, April issue.)

DISCUSSION

DR. LEDA J. STACEY, ROCHESTER, MINN.—In a study of another group of married women during the child-bearing period, I found that 11 had become pregnant subsequent to the application of radium. There were in this group 10 normal living children, 5 stillbirths and 2 miscarriages. With the exception of one patient who received 615 mg. hours of radium and who gave birth later to two normal children, these patients received an average dose of 320 mg. hours of radium. In using radium in young girls one must always keep in mind the conservation of the ovarian function and give only the small dose, not more than 300

mg. hours. In older women sufficient time should elapse before radium is repeated if the results following the first treatment are not satisfactory. The full effect of radium is often not obtained under three months' time. Dr. Cleland has reviewed the contraindications to the use of radium, and I should like to add one other, that is the presence of submucous fibromyomas, as I believe most of our failures have been in those cases. In 1922 I reported 3 cases of carcinoma of the fundus occurring in a group of 1013 patients having received radium for benign conditions, and there has been one since that report was made. Therefore, if irregular bleeding recurs after the radium, carcinoma must be considered as a possible cause, and I believe it safer to remove the uterus unless there is a definite contraindication to surgery rather than to depend upon a curettage for diagnosis and a repetition of radium treatment.

Dr. Bland has called attention to pyometra following the treatment of carcinoma of the cervix with radium. We have observed this complication in the Mayo Clinic in only a few cases, and I believe it can be avoided in most cases by making one or two applications into the body of the uterus during the course of radium treatments.

DR. S. E. TRACY, PHILADELPHIA, PA.—As pointed out by Dr. Bland, a certain percentage (about one per cent) of patients with carcinoma of the uterus treated with radium will develop a pyometrium. The proper treatment for this complication is prompt and efficient drainage whenever possible; in some cases, however, hysterectomy will be necessary. Those who have had experience with radium are agreed that it is the best treatment for bleeding in fibrosis uteri. Simple uncomplicated fibromyomas of the uteri in women past the age of forty years can in a large percentage of cases be satisfactorily treated with radium. The proper selection of cases is a matter of diagnosis. The more expert the diagnostician the smaller will be the percentage of cases selected for this method of treatment, the better will be the results and the fewer the failures. During the child-bearing period these patients with fibromyomas should be treated by conservative myomectomy. The use of radium in these younger women is destructive treatment and should be employed only in exceptional cases.

DR. F. S. WETHERELL, SYRACUSE, N. Y.—Several important points have been brought out in this symposium, which it will do no harm to reiterate. Dr. Dannreuther spoke very forcibly of the danger of the promiscuous use of radium emanation. A man who has not made a special study of radio activity and who, furthermore, presumes to use radium in gynecologic cases without having had a gynecologic training is bound to run into serious complications, which may mean more than mere disability to his patient.

The danger of a latent infection being lighted up by the use of radium in the uterus is one that must be ever foremost in the mind of the man using it. It was stated that infection may remain latent for five or six years. A case which I saw will make it plain that infection may remain latent for even a longer period. A woman was seen by me with her family physician. She was well bled out as a result of fibroids. Careful examination showed a freely movable uterus, with no apparent adnexal disease. Her past history showed that ten years before she had undergone a criminal abortion, which was followed by pelvic inflammatory disease, requiring a pelvic puncture. Despite negative findings in regard to the old inflammatory disease, this patient, following irradiation, developed an acute pelvic peritonitis with extreme distention of the intestines and for several days looked as if she were going to die. She finally recovered.

The fact that a careful history showed that there had been no acute inflammation in the pelvis since her operation, ten years previous, seems to me quite conclusive evidence that we must go carefully into the histories of these patients for even more than five or six years if we are to avoid this sort of thing.

NEW YORK OBSTETRICAL SOCIETY

STATED MEETING OF NOVEMBER 13, 1928

DR. DONALD MACOMBER, Boston, Mass., presented a paper (by invitation) entitled **A Statistical and Clinical Study of 1,000 Cases of Sterility**. (For original article, see page 621.)

DISCUSSION

DR. R. L. DICKINSON said he had heretofore repeatedly taken issue with Drs. Reynolds and Macomber because they did not present any statistics, particularly in their book. Here they come with the largest series extant.

Our old statistics must all be scrapped because the male was absent. We have here one of the first instances of an expert in the care of the male taking extended interest in the study of the woman. This is also important in that the study contains the largest series with the ovary inspected at operation. Dr. Dickinson hoped that when Dr. Macomber prints his lists he will describe in great detail those ovaries that have been inspected and those ovaries that have been stripped or opened up. His number of "cystic ovaries" constitute an outstanding feature of his list.

Boston has been the Mecca of the sterile for many years. Yet another prophet has arisen in New England. At a recent round table conference on sterility in Boston during the recent meeting of the American College of Surgeons, Dr. Meaker's group (Dr. Murray for the medical side, Allen Rowe, the biochemist, Dr. Vose, the urologist) presented human endocrine studies. They showed low metabolisms, as Litzenberg has, with thyroid alone curing sterility in apparently healthy people. The weight that they laid on endocrine responsibility was striking. They found need of greater stress on male responsibility than on female. Meaker also brought forward 100 cervicitis cases with the statement that from the lack of reaction of bacteria and pus on semen, and absence of acidity he concluded that the trouble in the cervix was mechanical; purely a mucous plug.

DR. H. G. BUGBEE said this was the first time he had heard a discussion on sterility in which so much emphasis was laid on the part that the male takes. About 33 per cent of the patients sent to him (Dr. B.) have at least temporary sterility, but only about 5 per cent of them are actually sterile.

There are so many points that enter into the question of sterility in the male that it is quite impossible to even touch upon them all in a discussion. In the first place, if spermatozoa are obtained and they are motile and the patient is potent, Dr. Bugbee believed that the male can be practically excluded from the question; he may have a certain degree of impotence, but with the clearing up of some slight local lesion he will do his part. On the other hand, if spermatozoa are not present in the secretion, he did not believe that one should depend upon only one examination. The most accurate examination of the male secretion is the condom specimen, and at least two or three examinations should be made if the first one does not show spermatozoa. If there are no spermatozoa present, then there is an obstruction. If there are spermatozoa present and they are not motile, there is probably an infection along the genital tract. If there is an obstruction, it is a question of the patency of the epididymis, or the vas deferens, or the ejaculatory ducts. A complete obstruction of the epididymis is, in the great majority of cases, due to bilateral gonorrheal epididymitis, and if this is the case there is only one possible treatment that will offer any hope, and that is an anastomosis between the vas deferens and the epididymis. That is a rather delicate

operation, but in certain selected cases it is worth trying. Hagner, of Washington, has reported twenty-one cases, in eight of which he obtained a cure.

On the other hand, there is the question of the spermatogenic function of the testicle which may be destroyed by various infections. In 20 per cent of cases of mumps there is an orchitis; infections of the testicle as an adjunct to infections in other parts of the body as in tonsillitis, influenza, etc., are not uncommon. So that this phase must be taken into consideration.

Then there is the question of impotence, which is a very broad one and which cannot be passed over lightly. There is a psychic phase and a functional phase, and the question of seminal vesiculitis is an exceedingly important element. There are patients with atonic testicles, with no elasticity. When they have intercourse there is no discharge of semen at all, or if it is discharged the spermatozoa are dead in the semen. Local treatment very often brings them back to the extent of becoming active. Dr. Bugbee had seen quite a number of cases which were apparently impotent yet cleared up under local treatment to discharge normal semen, and conception took place.

DR. W. H. CARY said that this accomplishment is especially noteworthy because of the inevitable difficulties encountered in sterility study: first, the scientific limitations, particularly those relating to the production of fertile ova; second, the economic consideration because of meticulous detail and length of time required in investigation; and, third, the ethical problems which are involved in the study of sex functions.

Two major barriers to competent study might, however, he said be lessened in many cases; for instance, complete and accurate data of past illnesses and operations, which are rarely available when inquiries are made even to Class A hospitals, should be procurable if proper records were kept and correspondence fully answered. The speaker stated he had asked the American College of Surgeons for an opinion as to the practicability and desirability of hospitals giving patients, upon dismissal, a complete summary of relevant data. Another obstacle is the diagnostic prejudices of many sterility patients. Such a patient has had a "positive" tube test by one physician, a husband who "qualified" through some other medical agency, and with the cause of sterility still a mystery, comes to the expert expecting miraculous treatment when she should have been referred anticipating successful diagnostic study.

The speaker then briefly reviewed his own statistics for comparison with Dr. Macomber's. In 57 per cent of his cases failure of fecundation is due to some condition which prevents the union of the sperm cell and the ovum. In 33 per cent of the cases the obstruction is in the fallopian tubes; about 5 per cent will be opened incidentally to some patency test; and a few cases of gonorrheal salpingitis will subside and pregnancy follow if the husband and wife are properly treated. In the remaining 24 per cent the obstruction is in the cervix and due to some change in the cervical secretion. These 24 per cent are subdivided as follows: In 14 per cent the changes in the cervical secretion are due to endocervicitis. Dr. Cary disagreed with Dr. Macomber in that he does not consider laceration of the cervix a cause of sterility, unless it gives rise to an endocervicitis which defeats sperm cell migration. In 5 per cent the increase in secretion viscosity is due to passive pelvic congestion; and in the remaining 5 per cent it is due to lack of cervical canal drainage, the result of stenosis which may or may not be associated with ante flexion. In an occasional case of secondary sterility, stenosis is due to traumatism. In this last 10 per cent the prognosis is excellent. Retroversion per se is not considered a cause of sterility by Cary. A complicating edema, however, may result in tube occlusion or cervix obstruction.

This leaves 43 per cent of cases in which sterility is due either to failure of the male or of the female to produce reproductive cells, or to some inherent de-

ficiency in the germ plasma. As statistics stand, the male carries that responsibility about three times as frequently as the female, but one should keep an open mind and consider that these figures are undoubtedly biased, for while we can examine the semen the same privilege is not accorded in the case of the ovum. Dr. Macomber may be right in attributing the importance he does to diminution in the number of the sperm cells, just as Dr. Moench may be justified in attempting to find an index of semen deficiency by counting the proportion of cells with variations in head lengths. As stated before this Society, Dr. Cary regards these two observations as indications of deficient spermatogenesis, but he cannot interpret them as sole indices of fertility. Biologists say that wherever there is an excessive production of reproductive organisms, such as the pollen of flowers, the seed of certain sea inhabitants and the sperm of mammals, a tremendous mortality is anticipated. Who knows when the destruction or abnormality of the semen becomes sterilizing? How can one determine it unless it be correlated with the reproductivity of the female? Girls are impregnated in whom the hymen has not been ruptured. The speaker has seen three cases in the last three months of women impregnated by a seminal leak that preceded ejaculation of semen.

A great deal of stress is placed on what the speaker calls purposeful activity of the sperm cells, by which he means an activity that varies from a mediocre motility in the same sense that a hurrying Wall Street crowd varies from a sauntering group in Central Park. After doing hundreds of postcoital tests of the semen, studying the migration of the sperm from the external to the internal os, with a fixed routine as to the preparation of the patient, the time after coitus at which the test is made, and the method of examination, he feels that he can at least measure the efficiency of sexual union in terms of sperm cell migration.

In closing, Dr. Cary said that there was something more to this question than the number, or the morphology, or even the activity of the sperm cells. He believed the next great step in this work would be the study of the life-carrying principle of the germ plasma, and that that advance will be made in the realm of physiological chemistry.

DR. MACOMBER (closing) said he agreed with Dr. Cary that cervical laceration in itself was not a cause for sterility, unless it is so marked as to lead to miscarriage.

It is the disturbance of the cervical secretion which results from the laceration that may interfere with conception. In order to make a classification concrete, something you can point to and put a large number of cases under, you must be somewhat arbitrary and the result is it leads to all sorts of misconception.

Dr. Macomber believed that the spermatozoa are a pretty good indication of the fertility of the male. Under the best conditions probably there will be one or two drops, possibly more, but usually less on the whole, of semen injected directly into the cervix. Now, the concentration of spermatozoa in those one or two drops cannot help being a factor in whether those spermatozoa are ever going to meet the ovum or not. He looked upon it largely from a physical point of view, rather than a biologic point of view. Dr. Macomber believed that the spermatozoa do not have purposeful motion, as if they were able to seek out the ovum, but that they ought to be considered very much as you consider molecules in a gas. We know that in a gas the molecules are all moving in different directions. If you introduce a gas like chlorine, for instance, into a confined space, the motions of the molecules of chlorine will eventually cause that chlorine to be diffused through the whole mass of the gas in the space in which they are put. What happens to the spermatozoa is a good deal like that. If there are enough of them they eventually spread along the lining of the uterus through the internal openings of the tubes and out into the tubes where there is some chance of their meeting the

ovum. From that point of view the concentration of the spermatozoa in the cervix is a very important thing. A very simple test of fertility is to count the number of spermatozoa per unit in the direct specimen of semen, which gives an index of the fertility of the man. It works out in practice; it correlates very closely with Dr. Moench's measurements of head lengths, with the size of the testicles and other elements of vigor.

DR. H. W. MAYES read a paper entitled **The Use of Mercurochrome as a Vaginal Antiseptic Before Cesarean Section.** (For original article see page 645.)

DISCUSSION

DR. R. M. BEACH said regarding the case of cesarean section reported by Dr. Mayes which terminated fatally, that during the sewing up of the peritoneum they probably punctured the intestine. The patient took the anesthetic poorly and while sewing up the peritoneal cavity, she was coughing and protruding her intestines into the wound. She was a perfectly clean primipara with unruptured membranes, and there was no reason why she should become infected at all.

DR. E. C. LYON, JR. stated that at the Woman's Hospital they had followed the technic described by Dr. Mayes in vaginal deliveries for a period of nine months, and had been very much impressed by it, especially in the last group which they had had. During August, September, and October of 1928, they had 128 deliveries in the ward with one case of morbidity due to sapremia, but with no cases of sepsis.

DR. MAYES (closing) said in reply to Dr. Bingham, as to the value of the aqueous solution of mercurochrome as an antiseptic, that they have been using a 4 per cent solution of mercurochrome on the obstetric service of the Methodist Episcopal Hospital for over four years. He believed it has a definite germicidal value because of the marked reduction in the morbidity since beginning its use and by the results of a bacteriologic study of the vagina and cervix at the time of delivery. A report of this work will soon be ready for publication.

Dr. Bingham certainly had an excellent record in his series of inductions. In Dr. Mayes' series before the use of mercurochrome, there was a morbidity of 29 per cent with two deaths from sepsis in 92 cases, while with mercurochrome there were 98 cases with a morbidity of only 9 per cent and no deaths from sepsis.

The value of mercurochrome is also shown by the hospital records during the last twelve months, during which 2065 cases were delivered with a morbidity of 5 per cent. In this series there were 10 maternal deaths. Of these one death was due to sepsis and this woman had a short labor and an easy spontaneous delivery. She had a staphylococcus infection which spread upward from the placental site. Five of the mothers died within twenty-four hours of delivery and one of these 5 was not delivered. The causes of death were given as follows, toxemia in three cases; shock and hemorrhage in four; pulmonary embolus in one; hyperemesis gravidarum in one; and infection in one.

PHILADELPHIA OBSTETRICAL SOCIETY

STATED MEETING, JANUARY 5, 1928

DR. FRANCIS J. McCULLOUGH reported a case of **Full-Term Extrauterine Pregnancy With Living Child.**

Mrs. M. L., aged thirty-six, para four, was admitted to the Department of Obstetrics, Jefferson Medical College Hospital, on May 8, 1927, with a tentative diagnosis of premature separation of the placenta. Menstruation normal, the last period occurred in August, 1926.

There was no history of pelvic infection nor had the patient ever been operated upon. She was married at the age of eighteen and had three previous pregnancies with normal labors at full term, the first in 1911, the second in 1913, and the third in 1919.

The patient experienced the usual "sick stomach" during the early part of her pregnancy. At the end of the second month, she had slight bleeding from the genital canal. This continued for several weeks. A provisional diagnosis of threatened abortion was made and the patient was kept in bed from November 1 until December 15, a period of forty-five days.

Ten days before she was advised to remain in bed, she experienced a severe attack of abdominal pain. This was accompanied by syncope. The attack was precipitated, she said, during a bowel movement. At this time a diagnosis of ectopic pregnancy was made and an operation was advised.

The patient was confined to bed for several days and during this time suffered considerable abdominal pain, distention, nausea, and vomiting. After rest in bed, the abdominal symptoms subsided and she gradually improved. On January 1, 1927, she resumed her household duties and remained well until May 8, 1927. On this day, following a bowel movement, the patient again suffered a violent attack of acute abdominal pain.

She was admitted seemingly in an extremely serious condition, pulse 120, temperature 95° F., and leucocyte count 18,000. She presented the clinical picture of a patient suffering with an acute peritonitis.

The abdominal wall was exquisitely tender and board-like. Fetal parts, owing to marked rigidity, could not be palpated, nor could heart sounds be heard. The enlargement of the abdomen corresponded, however, to a full-term pregnancy. Surrounding the umbilicus, there was an ecchymotic area, or a bluish black discoloration.

Pigmentation, typical of pregnancy, was found on the face, breasts and mid-abdominal line. There was no discoloration of the vaginal mucous membrane, and the cervix was not soft. There was no vaginal bleeding. No presenting part could be felt on vaginal examination.

At immediate operation a free median abdominal incision was made. On entering the peritoneal cavity a full-term child was found. This was removed without difficulty. The baby, a male, was perfectly developed and weighed seven pounds and three ounces. There was only a small quantity of amniotic fluid. At several points, the amniotic sac was adherent to the stomach. The placenta was attached to the right broad ligament and to the structures in general on the right side of the lower abdomen.

On account of the broad attachment of the organ, no attempt was made to remove it. The membranes were delivered through the abdominal wound and stitched to the parietal peritoneum, the amniotic cavity being packed with sterile gauze at the same time.

During the first thirty-six hours after operation, considerable blood oozed from the wound, requiring several changes of dressings. Two days after operation the general condition of the patient was good.

On May 14, six days following operation, a part of the gauze was removed and on May 16, all the packing was withdrawn. The patient continued to improve from day to day. At times, there was some bloody discharge from the incision, but this was not alarming.

On May 22, however, fourteen days following operation, the patient developed a temperature of 103° F. This was preceded by a chill and she also experienced considerable pain in the right lower abdomen. On May 25, seventeen days after operation, there was considerable bleeding from the wound. An examination was made and the placental mass was found close to the abdominal wall. From this time on, there was a slight discharge of blood from the abdominal incision.

On June 1, twenty-four days subsequent to operation, a violent hemorrhage developed, from which the patient succumbed within a few hours.

DISCUSSION

DR. WALT P. CONWAY said he saw a case, somewhat similar to the one just reported, in the Atlantic City Hospital about twelve years ago. This was the only one in the hospital during a term of about twenty years and was reported before this Society. The woman was admitted with a diagnosis of abdominal pregnancy, with a probably dead fetus. Laparotomy revealed a dead fetus on the right side of the pelvis. The placental vessels were thrombosed and the ovisac was entirely within the right broad ligament. It was a right tubal pregnancy, unruptured, at term. On account of the purulent character of the fluid, drainage was inserted in the lower angle of the wound. The baby and the placenta together weighed about 5 pounds. The patient made an uneventful recovery.

DR. W. R. NICHOLSON said that about twenty years ago at the Gyneccean Hospital, he had his only experience with full-term extrauterine pregnancy. When this patient was admitted the child was dead. There was no history of symptoms suggesting rupture at any time during her pregnancy, but one month before admission she went into what her attendant diagnosed as labor. The doctor, according to her statement, was with her all night, urging her to bear down. The diagnosis in this case was moderately easy, because one could definitely feel the head presenting in Douglas' culdesac, entirely outside the cervix. This was very easily appreciated. At operation he was able to deliver the placenta without hemorrhage. Of course this is a usual experience when the child has been dead for some time. On the other hand, in the case of a living or but recently dead child, a placental removal is often so hazardous a procedure that it is best to avoid it unless it is very easily removed, or, in other words, unless it can be ascertained that it is not attached over large blood vessels. In case that removal of the placenta seems to be out of the question, Dr. Nicholson believed that it is much wiser to pack the amniotic cavity, leaving the lower angle of the wound open, than to close the wound entirely with the idea that the placenta will be later absorbed.

DR. CHARLES C. NORRIS said that the most interesting problems that these cases present is the question of how best to deal with the placenta. Dr. Polak and others have suggested and practiced closing the abdomen leaving the placenta in situ. Dr. Norris had no personal experience with this procedure, but, however, had operated upon two cases of lithopedia which were both apparently at term and in which no trace of the placenta could be found.

DR. BARTON COOKE HIRST described the case of a woman who came to his office stating that she had ceased to menstruate fourteen months before but the period had returned regularly for the past five months. She had a huge abdominal tumor. He could feel the unimpregnated uterus pressed down and backward by the tumor above it. There was an entire absence of the signs of pregnancy. Dr. Hirst operated on her the following day believing she had an ovarian cyst but found a full-term pregnancy with an overgrown fetus. Had an x-ray picture been taken the mistake in diagnosis would have been avoided. He had no difficulty with the placenta which was removed entire. Dr. Hirst had two other cases at six months, treated in the same way. In regard to Dr. Polak's recommendation, a letter he received a short time ago would make him hesitate to leave the placenta in the abdominal cavity. A practitioner in the west impressed by Polak's recommendation, left the placenta in the closed abdominal cavity, but three hours later there was a separation of the placenta from its attachments and the woman bled to death.

STATED MEETING, FEBRUARY 2, 1928

DR. BERNARD MANN presented a report of a case of **Abdominal Delivery of Triplets.**

D. F., white, aged twenty-six years, primipara. Menstruation began at fourteen years, every twenty-eight days, 3 to 4 days' duration, moderate flow, always painful. She last menstruated April 15, 1927. Nausea and vomiting were severe for the first four months. The urine showed slight trace of albumin. The patient's mother had had twins. There was no other multiple pregnancy in her family nor in her husband's family.

She was seen for the first time on November 23, 1927, in consultation at the Children's Homeopathic Hospital. She had been in active labor for the past twenty hours, having severe bearing down pains which were almost continuous. The abdomen was tense, and appeared larger than the average at term. Palpation caused severe pain. The uterus being firm and in continuous contraction it was impossible to outline the fetal body. Fetal heart sounds were heard. The cervix not entirely effaced and about four fingers' dilatation. The membranes were bulging. The presenting part was high up and not engaged.

The diagnosis was either an overgrowth of the fetus or multiple pregnancy. In view of the above findings it was thought best to do a section.

Triplets were delivered by cesarean section. One male weighing 4 pounds 14 ounces and two females, one 4 pounds 11 ounces and the other 4 pounds 5 ounces. They appeared healthy and cried shortly after birth. The male baby which was second to be delivered had its cord twisted around its neck twice. The position of the third was transverse.

The placenta was about twice the average size, three distinct amniotic sacs, and three cords. The uterine wall was quite thin and there was more bleeding than one finds in the average cesarean section. This was satisfactorily controlled by a second ampoule of pituitrin.

The third day following operation, she developed a cough, elevation of temperature to 101°, pulse 90 and respiration 30. Examination of the chest revealed a lobar pneumonia in the left lower lobe posteriorly. Blood count was R. B. C. 5,250,000, Hb. 75 per cent. W.B.C. 15,000. Polys. 85 per cent.

At no time was there abdominal distention, and after the fourth day there was no pain in the abdomen. The lochia were normal. The uterus was well involuted, freely movable and normal position. The sutures were not removed until the fourteenth day on account of a cough.

On the tenth day the temperature was normal and she was discharged in good condition on December 11, 1927. Eighteen days following the delivery, the babies were healthy and gaining in weight.

The statistics for the birth registration area of the United States for 1925 show that there were 1,878,880 births. There were 21,536 sets of twins or 1 in 87. There were 246 sets of triplets or 1 in 7800. There were 5 quadruplets or 1 in 375,776.

STATED MEETING OF MARCH 1, 1928

DR. CHARLES W. BURR (by invitation) read a paper entitled **Neurologic Symptoms in the Pregnant Woman**. (For original paper see page 653.)

DISCUSSION

DR. EDWARD A. STRECKER (by invitation) spoke on psychiatric manifestations in obstetrics and gynecology, and said that it is interesting to determine just why that portion of the human anatomy which has to do with sex life and procreation should occupy such a prominent rôle in the symptomatology of the neuroses and more indirectly of the psychoses. In the first place, the sex organs and their appendages constitute the channels for the expression of a powerful instinct. Psychologists disagree about most things, and they disagree with such vigor and vindictiveness about the number of our instincts, but they are in accord in their belief that along with self-preservation, sex and self-perpetuation are dominant in the instinctive demands they impose on the individual. Just as "murder will out" so will an instinct find expression in our everyday conscious life and determine much of our behavior. If this is true normally, it is doubly true in abnormal mental life or insanity and in the neuroses, since both are often queer and distorted outlets and refuges from the too difficult impositions of actual life. This is one reason.

Another reason is that sex and sex practices are indissolubly bound up with history and evolution of the human race. Unquestionably many of the religious ceremonies of primitive man were primarily and openly sexual in their significance. Some of the rites and festivals which are still observed may be traced back to remote times where they were frankly appeals and sacrifices to the gods who presided over the sex destinies of the individual and its fruition. Within the period covered by recorded history, there runs the same thread of sex and great interest in anything pertaining thereto. In that sanitary code known as the Mosaic law and in other formulas of civilized people, particular attention is paid to the menstruating woman. She is labelled as unclean, and it is inferred that she is poisonous, since she is not only forbidden to have intercourse but even to touch growing grains and crops. Somewhat ingenuously but rather unscientifically the Freudians have inculcated this into their doctrine so that when a woman dreams that while menstruating she has sex relations with her husband, it is interpreted as an unconscious desire for the death of the husband. Furthermore, sex for the average person is clothed in mystery. Many individuals otherwise fairly intelligent earnestly believe and suggest to the psychiatrist, that the cure for mental deviation or nervous disorder is the re-establishment of the menstrual function or sex intercourse or an operation on the genital tract. Without expounding the theme at too great length, it is clear that our sex heritage is heavy and that it permits of obscure interpretations so that the mind which is neurotically or psychotically inclined readily finds fascinating material to elaborate.

Finally, the complex system of modern civilization has necessarily operated to frustrate the complete exercise of sex life and childbearing. Monogamy is the rule. Marriage must often be deferred for economic reasons and many

women are denied a mate. The bearing of children may be postponed because of economic stress or for even less valid factors, and naturally this has led to the utilization of various contraceptive devices which are psychologically more or less harmful. The symptoms of a neurosis or psychosis not infrequently are derived from previous repressions, distortions or denial of sex satisfaction. These then are some of the reasons why the genital tract competes with the gastrointestinal canal as a favored site for the fixation of neurotic or psychotic symptoms.

The idea that there is either a gynecologic or obstetric psychosis which is specific is almost as obsolete as is the notion of the ancient Greeks that hysteria was due to the wandering of the womb about the body. In regard to the psychiatric aspects of gynecology Dr. Strecker felt that the most that can be said is that because sex is an instinct, because of the sex heritage of the race and the mystery with which it is clothed, because of the impediments and restraints which the code of civilization of necessity places in the way of natural and complete sex expression and satisfaction and for other reasons, many of them to be found in the personal sex life of the patient, it must be expected that the clinical picture of neuroses and psychoses will contain many details which refer either openly or indirectly to the genital apparatus.

DR. BARTON COOKE HIRST said he could not agree with the opinion that there should be a combination of a gynecologist and a neurologist in constant association during the treatment of a case mainly neurologic. In his opinion the gynecologist should do what work the physical condition of the patient requires and should then retire. His continued presence may easily contribute to the worst displacement of the pelvic organs known—they occupy the woman's mind.

Dr. Hirst's main interest in these neuropsychics is to avoid being misled by simulated symptoms, concealment of basic facts or false statements. A woman complaining of very frequent urination without any demonstrable cause, after a careful study, is fairly certain to be addicted to masturbation. One woman came to him in great distress of mind because her daughter, a girl of seventeen, well born, well bred, with every financial and social advantage, had coolly informed her mother that she proposed to lead the life of a courtesan and had already begun to do so; a second *Ninon de l'Enclos*. An examination revealed an intact hymen, and subsequent investigation showed that the girl was masturbating incessantly and revelling in the thoughts of sexual indulgence.

Dr. Hirst cited several cases of psychic disturbances with intentions to delude, among them an intractable case of metrorrhagia in a young girl which resisted all therapeutic measures and was found to be due to a stab wound of the uterus inflicted on it every morning with a hat pin.

THE CHICAGO GYNECOLOGICAL SOCIETY

MEETING OF JUNE 22, 1928

DR. EMIL RIES presented a specimen showing the **Effect of Lipiodol Injection on the Tubes.**

The patient, a woman thirty years old, consulted Dr. Ries three years ago because of sterility. There was no tumor in the pelvis. She was given an insufflation test, but the air did not go through. A year later the same test was repeated at Rochester, Minn. She was informed that nothing went through. Early this year she consulted another Chicago gynecologist, who tried to pass a gas through the tube and found it did not go through. He then made a lipiodol test and obtained a plate which appeared to show that the lipiodol went through. This picture was taken very shortly after the injection. The woman then felt all right.

There was no reaction of any importance after the lipiodol but about two months afterward she began to get sick and to have pain. Early this month she consulted Dr. Ries.

The abdomen contained tumors which could be palpated from the outside. Vaginal examination showed the uterus in place. On the left side there was a cystic mass which extended up to a mass which could be felt on the outside, and on the right side a small mass could be felt. He thought it was a salpingitis and felt that the only chance of saving any of the organs was to operate.

When he opened the abdomen, the adhesions were so extensive that none of the pelvic organs were visible. The peritoneum was adherent to the omentum, the omentum was adherent to the uterus, the sigmoid flexure was adherent to the appendix, and the bladder was drawn up over the anterior surface of the uterus on the right side, so that it was adherent to the right appendage. On dissecting away the omentum he found cysts and walled off fluid among thin adhesions. Examination showed that this fluid was sterile and it contained no iodine. On lifting up the small intestine he found on the under surface of the mesentery of the small intestine stone-like formations imbedded in the serosa of the mesentery. Further examination revealed at least twenty-five of these masses. They showed no structure and could be easily broken with the thumb nail. They contained no iodine and consisted of cheese-like masses held together evidently by some strands of connective tissue. These stone-like formations were present not only on the mesentery of the omentum but in the adhesions in the pelvis. All the way down to the bottom of the culdesac was a mass of adhesions which formed a rather thickened cyst in the culdesac containing small masses of these concretions.

Both tubes were dissected out, leaving behind the right ovary. On the right side there was an open fimbriated end with the tube thickened and hardened so that it was hardly possible for anything to go through. But theoretically this tube was patulous from the uterus to the abdominal cavity. On the left side there was no opening at all. The mucosa of that tube was also enormously thickened. There were grayish crusts in the tube. The microscopic examination of these tubes showed a most unusual picture. The tubal mucosa had disappeared in large areas. In other areas the lining was a typical tubal epithelium. There were enormous quantities of giant cells and in these were found greenish masses without structure, homogeneous in appearance in places and in other places more granular. Some of the cells contained small particles of this green substance. This condition prevailed in both tubes, in the open as well as in the closed tube.

Dr. Ries concluded that at the time of the last gas and lipiodol injection, as regards the adhesions, it was possible for the air to go through the open tube and yet escape recognition. One could not hear it go through, and the x-ray would not show it in the pelvis because it would be difficult to tell whether it was gas in the bowel or gas in the peritoneal cavity. The only way to be sure that gas has gone through is to find a gas bubble between liver and diaphragm, and the adhesions in the pelvis of this case might prevent that. This case showed such serious damage to the tubal tissue that careful experiments should be done to decide whether it is justifiable to inject lipiodol where there is a question of retaining a functioning tube. If it turns out that the tubes are damaged regularly in this same way, lipiodol will have to be used with considerable reservation.

DISCUSSION

DR. LOUIS RUDOLPH said this patient was seen by him in October, 1927, at the request of her physician, who said that the patient had a negative pelvis except for a mass on the left side which he diagnosed as an ovarian cyst, and asked that a Rubin test be made. The test was made but Dr. Rudolph was unable to get any air through with pressure up to 200 m. On December 1, 1927, he was asked to do

a lipiodol test. There was no reaction, as Dr. Ries said. He saw her again January 22, 1928, at which time there was a negative pelvis with the exception of a left ovarian cyst. She telephoned him six weeks later and said she was in good health. She later saw Dr. Ries.

DR. SYDNEY S. SCHOCHET said there were one or two points which might be of interest regarding the experimental side of lipiodol. Some time ago Dr. Stein was very enthusiastic about organic iodine, and he and Dr. Schochet were studying the problem of tissue reaction to lipiodol. The full text of this work will be later presented by Dr. Stein, but it may not be amiss to speak of some of the things observed in the uterus of the guinea pig.

They noticed that in those animals in which lipiodol passed through into the peritoneal cavity most of the lipiodol was taken up by the omentum. Dr. Ries's failure to obtain the test for iodine may be due to the fact that lipiodol is an organic compound and unless it is saponified, the routine test for iodine gives negative results.

Another interesting thing they noticed was the effect on the mucosa. There was a marked edema and the presence of leucocytes (lymphocytes). The animals were injected under sterile conditions. An opening was made through the anterior abdominal wall, and the horns of the uterus were ligated, so there would be no infection from the vagina or cervix.

DR. GUSTAV KOLISCHER presented a paper entitled **Modern Conceptions of Renal Derangements in Pregnancy**. (For original article see page 661.)

DISCUSSION

DR. CAREY CULBERTSON said that Dr. Kolischer's explanation of what kidney derangement means is brought down to the lowest common denominator, that kidney change is due to the retention of toxic products, the end products similar to the changes which take place in the liver. This, of course, has been recognized as the probable thing for some time, that is to say, the changes are due to the things that are causing intoxication of the system as a whole. The essayist has brought this out very clearly in his reference to retinitis, namely that retinitis is not due to kidney change but is one of the symptoms of a general metabolic breakdown. His explanation of the relation between these changes and eclampsia and the preeclamptic state were covered in the same way. This means that in the prenatal clinic the patient must have all of the same careful laboratory work which the pregnant patient in the hospital has after she has come in in labor or in eclampsia, or without labor showing a preeclamptic condition. That means, of course, that the prenatal clinic must be provided with all the laboratory advantages that the hospital patient has.

In recent years our ideas have changed regarding the appearance in pregnancy of pyelitis. It was formerly thought that pyelitis was a thing that occurred late in pregnancy. It is now known that it is found early in pregnancy. Case after case is seen where a careful study of the history of preceding pregnancies showed pyelitis to be present but unrecognized. Dr. Culbertson recently saw such a case, a para iii. She was in the third or fourth month of her third pregnancy, the last child having been borne twelve or thirteen months previously. She undoubtedly had a pyelitis then, but it had not been recognized. The pyelitis present in this third pregnancy was merely a "hang-over" from the pre-existing one that had been passed along.

DR. C. S. BACON asked about the indications for the nonspecific protein reaction which Dr. Kolischer spoke of as a diagnostic and therapeutic agent, and under what condition would he consider it indicated.

DR. KOLISCHER in closing said that it was well known that in certain infections the administration of any foreign protein will act favorably. The injection of milk is of value. In other cases the administration of casein is of value. As to the indications for the use of these foreign proteins, the injection of milk leads not only to a very severe local reaction but to a general reaction. Pregnancy is always a barrier to a certain extent, and consequently such a reaction would be undesirable. By the injection of the patient's own blood there is no local reaction and no general reaction. The usual technic is to take 8 to 10 c.c. of the patient's blood under the usual aseptic precautions and to inject in the gluteal muscle. A few days afterward the elimination is improved. This uniformly good result is explained by the fact that the reticular endothelial system is stimulated by these protein injections. The presence of edema may be explained in two ways. In nephrosis on account of the accumulation of chlorides within the tissues, water is attracted and retained. This is the nephrotic edema. It is known from the work of Jaffe and Petersen that bacterial toxins produce extreme permeability of the capillary walls. Edema in this condition is nothing else but a toxic transudation. Edema in nephritis means a very severe capillaritis. There is an old tradition that if there is any renal derangement the patient should be flushed, and an enormous quantity of water is administered. That is a mistake. One of the features of the treatment in nephritis is restriction of the intake of fluid. In nephrosis a simple way to prevent edema is to restrict the intake of salt. The human body under all conditions will eliminate a certain amount of chlorides. If the supply is cut off, then the body is forced to draw on its deposits within its own structure, and this part of the chlorides is eliminated, thus relieving the edema. The taking away of salt from a patient with nephritis is very disagreeable to the patient and of no therapeutic value.

There is one test which is not applied as often as it ought to be, the so-called concentration test. If in a patient with normal kidneys the fluid intake is entirely cut off for ten hours and the urine examined at regular intervals, it will be found that the specific gravity will constantly rise. The kidney that is altered in its function will show either a steady level of specific gravity or the specific gravity will decrease, which means that such a kidney without water supply is unable to eliminate the necessary amount of solids. There is no one single method of testing the kidney function. The kidney has three distinct functions, the production of urine, the elimination of waste products of organic and inorganic origin, and the elimination of water. Each of these functions has to be tested separately. As far as testing the reticular endothelial system, it is a matter of biochemic examinations, and their results may add very important data to the clinical picture.

DR. S. J. FOGELSON by invitation presented a paper entitled **Cholecystography as an Aid in Determining Gall Bladder Stasis in Pregnancy.** (For original paper see page 613.)

DISCUSSION

DR. MARK T. GOLDSTINE said he was especially interested to see what this would do for pregnant women clinically. These patients come in with rather severe attacks of dyspepsia, pain in the upper right quadrant, some nausea and vomiting, and the vomiting of a bitter fluid. Dr. Goldstine found that a fat meal afforded relief. Possibly these attacks of pain in the right upper quadrant with indigestion and stasis are associated with infection, a cholecystitis, and the fat meal, while not particularly relieving stasis, does help the gall bladder to drain into the duodenum and prevents the bile from backing up into the stomach. In this way relief of symptoms is obtained, and with better drainage likewise relief from the infection.

DR. EMIL RIES said it must not be forgotten that men have gallstones as well as women, and to prove that there is anything in pregnancy that predisposes to gallstones, one would have to prove the overwhelming frequency of gallstones in women in comparison with men. All the statistics are mostly worthless because they are not taking into account the comparative numbers of men and women in certain regions, the comparative number of women who have been pregnant and who have not been pregnant in the same region. If medical statistics were not in such a chaotic condition, one might draw some conclusions from them.

He said that in 1889 he wrote a doctor's thesis on albuminuria of pregnancy and its connection with eclampsia. In those days the theory of the pressure of the uterus on the ureter causing albuminuria of pregnancy was generally believed. He proved in his thesis that it might be the cause. The profession has since retreated considerably from the idea of the possibility of organs packed together in the abdominal cavity squeezing each other. They can squeeze only under very abnormal conditions and only when they are fastened there. Only those cases have we allowed as causing pressure. The old idea of the retroflexed uterus pressing on the rectum and causing constipation was a similar idea. There is no more question of pressure from the retroflexed uterus on the rectum than there is of the liver pressing on the colon. And so Dr. Ries is not inclined to pay much attention to any idea of pressure of the pregnant uterus on the ducts and gall bladder, but there might be some conditions in pregnancy that help to lead to the formation of gallstones. Examination of the cholesterol content of the bile in pregnancy and outside of pregnancy and the connection of the cholesterol deposits with stone deserve more attention than the old idea of pressure. It does not belong to the subject of the evening, and probably the essayist did not want to consider it. He just tried to prove or disprove one particular cause that has been mentioned, namely the question of stasis.

DR. A. F. LASH said that Dr. Roos of the Rockefeller Institute definitely proved that dysfunction rather than stasis of the gall bladder due to disturbances of metabolism in this viscus was the cause of stone formation. Owing to the increased production of cholesterol in pregnancy, gallstones should be more common in pregnancy due to disturbances of metabolism in the gall bladder associated with the general changes in pregnancy.

DR. FOGELSON, in closing, said this phase of the work is just one unit of the problem. No one can consider cholelithiasis without considering cholesterol formation in pregnancy. Another important factor which was not mentioned by the discussors is hypercalcemia. Those two factors must be considered in considering etiology of gallstones. German authorities seem to be of the opinion that the cholesterol content of the blood is higher in the first half of pregnancy than in the latter half. That is significant as most of these biliary attacks begin in the last trimester of pregnancy. So he looks a little askance at cholesterol.

It likewise has been demonstrated that with a change in the hydrogen-ion content there is a definite precipitation of calcium in the bile, the precipitated calcium particles acting as nuclei for stone formation.

In answer to Dr. Goldstine, Dr. Fogelson noted improvement in all six cases. The first patient was five months pregnant and definitely jaundiced. She improved almost miraculously on the feeding of egg yolks and cream. With the work Ivy has done in developing cholecystokinen, there is now something with which stasis can be eliminated in this gallstone formation. With stasis eliminated in the formation of gallstones, further work is now being done upon the other factors, namely hypercalcemia and hypercholesteremia.

Correspondence

The Estimation of Histologic Malignancy From Biopsy Sections

To the Editor.—In a recent communication Martzloff¹ reported his investigations into the prognostic significance of an evaluation of the histologic structure of biopsy sections of carcinomata of the uterine cervix. He came to the conclusion that in about 30 per cent of the 70 cases examined a discrepancy existed between the predominant cell type observed in the biopsy sections and that seen in the numerous sections taken from the parent tumor after surgical removal of the uterus. On the basis of these observations he attempted to discredit the work of several radiologists (Schmitz and Hueper², Boehm and Zweifel³ and others) who used biopsy sections for the determination of histologic malignancy. His criticism is based upon the assumption that these workers used the predominant cell type present in these sections as the sole criterion on which to draw their conclusions. Furthermore he apparently tried to produce the impression that they made their statements somewhat carelessly as they omitted to ascertain the fact if the findings of biopsy specimens can be regarded as representative for the whole tumor. As his paper contains a number of fundamental errors and is also otherwise open to criticism, I do not consider it opportune to leave his assertions unchallenged.

1. The work of Hueper and Schmitz represents the results of investigations of a histopathologist in conjunction with a radiologist.

2. A more careful study of the papers of Schmitz and Hueper as well as of Boehm and Zweifel would have shown Martzloff very readily that these authors do not use the cell type as the only criterion for the degree of malignancy. The histologic malignancy index (Hueper) represents the end-result of a numerical evaluation of nine different factors of which the degree of cellular differentiation is one. I may add that I have recently increased the number of factors even to twenty including also those pertaining to the antiblastic qualities of the stroma. The relative prognostic significance of the degree of differentiation is by this procedure still more decreased. It is obvious that all the conclusions drawn correlate the prognosis with the malignancy index and not with the cell type. We decline, as that is expressively stated in the paper referred to by Martzloff, to draw any conclusions upon the prognosis from the cell type alone. This method appears to us by far too one sided and open to individual interpretation and is therefore regarded as inferior to ours. We are supported in this standpoint by the investigations of Plaut⁴ and Kahlstorff⁵ who criticized rather severely all those methods of malignancy determinations in which the degree of differentiation represents the exclusive criterion and in which no consideration is given to the degree of anaplasia, infiltrative growth, cellular character, condition of the stroma, etc. Similar misinterpretations exist in regard to the work of Boehm and Zweifel. They stress the point that not only the status of the carcinoma cells but also that of the stroma has to be taken into consideration. Besides the degree of cellular differentiation they evaluated the nucleocytoplasmic ratio, the number of mitoses, the degree of leucocytic infiltration of the stroma, the cellular character of the tumor, the condition of the cytoplasm of the carcinoma cells, the character of the stroma. It is obvious from this discussion that the methods employed by Hueper and Schmitz and Boehm and Zweifel differ considerably from that used by Martzloff. His criticism is therefore wholly unfounded in one of the fundamental issues of his paper.

3. His second main objection, which is contained in the sentence "It is essential to know as a minimal requirement how valuable biopsy material may be in its ability to reflect cytomorphology of the parent tumor," lacks also any foundation as far as my work is concerned. I employed an even more critical method than Martzloff in ascertaining the facts in regard to this relation. The sections taken from ten or twelve different places of cervical carcinomas of several uteri were mixed after they had received the proper designations not visible to me during the examination. After the evaluation of the histologic structure in all sections had been completed, the results obtained in the different sections of the same carcinoma were compared. This procedure was repeated several times during the past three years. As the result of this study I can state that biopsy sections if properly taken according to the rules laid down in several of my papers are with very rare exceptions a reliable index of the histologic structure of the parent tumor. This observation is, moreover, supported by the investigations of Lahm⁶ and quite recently also of those of Healy⁷ from reports of the laboratory of Memorial Hospital (Ewing). Martzloff's work cannot be regarded as the final and definite answer to the question raised by him to say the least.

4. But also from other viewpoints the study of Martzloff appears to me not very convincing. In about fifty per cent of the photomicrographs used as pictorial evidence of the existing discrepancy between the predominant cell type in biopsy specimen and parent tumor, retouches are made (Figs. 8, 10, 11, 14, 15). In Fig. 15 the presence of retouches is not noted in the description. Without these retouches the histologic structure of the sections as present in these pictures does not differ considerably. The conclusive force of the pictorial evidence offered is impaired by such a procedure. Moreover, different magnifications are used for the pictures taken from the sections of the same tumor. A fair comparison of the pictures is made impossible by this technical defect. Furthermore the pictures cannot convey any definite information in regard to the predominant cell type present in the sections, as it is very often possible to demonstrate in cervical carcinomas with their more or less mixed cellular structure smaller areas in which the cell types present differ completely.

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February 15, 1929.
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Magnesium Sulphate Dosage in "Synergistic" Analgesia and in Tetanus

To the Editor.—As an incidental contribution to the controversy which has arisen between Gwathmey¹ and myself² over the alleged synergism of magnesium sulphate and morphine, it has occurred to me that it might be very profitable to institute a comparison between the dosage of magnesium sulphate when used alone in the treatment of tetanus and the dosage of the same drug when used in combination with morphine in the so-called "synergistic" analgesia. In the treatment of tetanus it is granted that any measures, however drastic, which will control the spasms are justified since if successful they conserve the precious strength of the patient; hence, the employment of otherwise prohibitive doses of all the sedatives. But in the induction of the state of analgesia, whether obstetric or postoperative, it is necessary that the minimum physiologic disturbance be set up consistently with accomplishment of the desired effect; which accounts for the constant effort to administer sedatives here in minimal doses.

Let us see to what extent these dicta are heeded in the several parenteral uses of magnesium sulphate.

Magnesium sulphate in tetanus.—The method of using the drug in the symptomatic treatment of tetanus has been nowhere better described than by Smith and Leighton,³ one of whose case reports is here reproduced.

"Case Report: Mrs. L. L., sixty-eight years old, was sent to the Lutheran Hospital by Dr. Reinhold Speer on June 25, 1922. She gave a history that her jaw became locked four days before admission. She had spasms in her throat and could not swallow. The patient had an abscessed tooth about three days before the symptoms began and presented a complete prolapse of the uterus with ulceration of the parts. The incubation period was not definite as the point of origin was uncertain. On admission the patient had extreme trismus with rigidity in the neck and legs. The recti muscles were so rigid that they felt like steel plates. The temperature was 99.4° F. and the pulse was 120. She had not been able to take food or drink for several days. The patient was given 3000 units of antitoxin and 30 grains of chloral hydrate at once. Ten thousand units of antitoxin were given intravenously and 16 c.c. of a 25 per cent solution of magnesium sulphate were given every five hours. On the next day, June 26, the condition was much improved. The spasms in the jaws, legs and recti muscles were distinctly lessened. The patient could take food and water and had slept fairly well during the night. On the next day, June 27, the patient could open her jaws fairly well and was quite comfortable and free from spasms. Twenty thousand units of antitoxin were given. On the following day, June 28, three days after admission, the magnesium sulphate injections were stopped, as considerable local irritation was occasioned by the injections. The next day, June 29, the muscles were again quite rigid and painful, so that the magnesium sulphate injections were again employed, and twenty thousand units of antitoxin were given intravenously. After a few hours the patient was sleeping and her condition was decidedly improved. On June 30 the injections of magnesium sulphate were stopped again. The rigidity increased somewhat but was relieved by the further employment of magnesium sulphate. On July 3, eight days after admission, 1500 units of antitoxin were given subcutaneously. The patient returned home July 9 entirely relieved.

"Comment: This was a very severe case of tetanus in an old woman. Her condition had been getting worse daily. She received a total of 54,500 units of antitetanic serum. On three different occasions the spasms recurred after the magnesium sulphate had been discontinued, and each time the spasms were relieved again by injecting magnesium sulphate. The effect was so convincing that I feel certain that the recovery was largely due to the effect of the magnesium sulphate."

It will be seen that the dose of magnesium sulphate which was sufficient to control the spasms in this severe case of tetanus for a period of five hours, which it did repeatedly, was 4 gm. (16 c.c. of a 25 per cent solution).

Magnesium sulphate in postoperative analgesia.—In the paper of Glass and Wallace⁴, who reported on the use of magnesium sulphate and morphine synergistically as preoperative treatment for postoperative comfort, the technic is described as "hypodermoclysis of a 4 per cent chemically pure and sterile solution of magnesium sulphate, 200 c.c. given one and one-half hours before operation." In addition, they sometimes gave two or three postoperative injections of 1.5 c.c. of 25 per cent magnesium sulphate plus doses of morphine which, in 11 of their 14 cases, ranged from $\frac{3}{8}$ to 1 grain. That is to say, these patients were given 8 gm. (200 c.c. of 4 per cent solution) of magnesium sulphate before operation, and in some cases approximately 1 gram additional with the morphine after operation.

Magnesium sulphate in obstetric analgesia.—Harrar,⁵ who has reported on the successful employment of rectal analgesia in 5800 cases of labor, describes that part of the technic which applies to the use of magnesium sulphate as follows: "At this time a cleansing soapsuds enema is given, and this is followed by the primary intramuscular injection of $\frac{1}{6}$ or $\frac{1}{4}$ grain of morphine and 2 c.c. of 50 per cent solution of magnesium sulphate deep into the gluteal region. . . . Twenty minutes after the primary morphine and magnesium sulphate injection we give a second intramuscular injection consisting of 2 c.c. of 50 per cent solution of magnesium sulphate alone. This is given no matter whether the effect of the primary injection is sedative or not, as it tends to prolong the action of the morphine. . . . A third intramuscular injection of 2 c.c. of a 50 per cent solution of magnesium sulphate alone is then given immediately [i.e., as soon as the rectal ether-oil instillation is completed] to prolong the action of the ether. . . . When the effect of the first ether instillation is worn off, that is, when the patient again complains of pain which is usually in from two to three hours, a second, or even a third, rectal instillation may be given at intervals of three hours or more. . . . Each subsequent instillation is accompanied with one intramuscular injection of 2 c.c. of 50 per cent solution of magnesium sulphate." That is to say, these patients receive 4 gm. of magnesium sulphate (a 2 c.c. injection of 50 per cent solution, repeated four times) regularly, and if a third ether-oil instillation is needed, an additional 1 gram of magnesium sulphate is injected (2 c.c. of a 50 per cent solution).

SUMMARY

I have made a tabular comparison of the magnesium sulphate dosage in these three conditions in Table I.

TABLE I. MAGNESIUM SULPHATE DOSAGE IN TETANUS, POSTOPERATIVE ANALGESIA AND OBSTETRIC ANALGESIA

REASON FOR MEDICATION	GM. $MgSO_4$ (REGULARLY GIVEN)	GM. $MgSO_4$ (GIVEN IN ADDITION)	OTHER TREATMENT
Tetanus	4		Antitoxin
Postoperative analgesia	8	1	Morphine
Obstetric analgesia	4	1	Quinine, alcohol, ether, olive-oil, morphine

From the foregoing it will be seen that in the preoperative use of magnesium sulphate to ensure postoperative comfort, the patient is regularly given twice as much of the drug as is required to completely control the spasms of a severe case

of tetanus for five hours, and that in the obstetric use of magnesium sulphate the regular dose is equal to that used in tetanus. Is it not little short of absurd to ascribe the good results obtained in these analgesic uses of the drug to its "synergistic" effect upon the morphine? The effect is doubtless an additive one since practically all sedatives do add their effects, but why postulate a synergism? Indeed, I think the time has about come when the term "synergistic analgesia," in so far as it rests upon the alleged synergism of magnesium sulphate and morphine, should be deleted from the permissible terminology of current journals.

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January 25, 1929.

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Albrecht, H.: Marital Fertility and Diminished Birth Rate in Europe,
Monatschr. f. Geburtsh. u. Gynäk. 80: 98, 1928.

During the years 1900 and 1901 Germany's birth rate among married women, namely, 286.1 for each 1000 married women under forty-five years of age, was higher than that of most European countries. However, by 1924 it had decreased to 146 per 1000 married women; a point far below that of most of the other European countries. France was the only nation which had a lower birth rate, namely 140.7. The first result of this diminution will be a decrease in population and the second consequence will be an advanced average age for the population. This in turn will increase the number of social problems. A more threatening situation arises from the fact that fewer and fewer children are being born among the higher classes of people.

Other countries also have suffered a reduction in births since the war. England, Sweden, and Luxemburg had 25 per cent fewer births in 1924 than before the war. In the Slavic countries the birth rate is at least 100 per thousand more than it is in Germany, France, or England, but the infant mortality is greater in the Slavic countries than in the others. On the other hand, in the former countries, girls marry at a much younger age, and hence, have longer periods of productivity. In Norway, Finland, and Ireland, the birth rate is low because the young men emigrate from their native lands. In Italy and Spain about 50 per cent more babies per thousand are born than in Germany; in Hungary, and Norway, one-third more; and in Finland and Denmark, one-fourth more.

J. P. GREENHILL.

Department of Maternal Welfare

CONDUCTED BY FRED L. ADAIR, M.D.

MATERNAL MORTALITY AND ITS PREVENTION

This topic was made the subject of discussion at the joint session of the Child Hygiene and Nursing Sections of the American Public Health Association with the American Child Health Association, October 16, 1928, at Chicago, Illinois. Challenged by statements that the United States ranks with those backward nations which have the highest maternal death rates, it was natural that a whole morning's session should be devoted to maternity care at this meeting.

The session produced a careful review, a critical analysis by competent obstetric authorities, and the story of a successful demonstration of safe, sound, and satisfactory maternity care in both urban and rural communities.

The Chairman, Dr. Fred L. Adair, mentioned that it was eighty-five years ago (1843) that Oliver Wendell Holmes and Semmelweis announced the contagiousness of puerperal fever. This disease and the toxemias of pregnancy remain the two major causes of maternal mortality, both theoretically preventable. In addition, maternal mortality with its subsequent disabilities could be largely eliminated. "Obstetrics," Dr. Adair said, "must be practiced on a sane and rational basis by well-trained physicians and nurses in institutions which are designed and equipped for this purpose. All mothers must receive adequate and proper antenatal, intranatal, and postnatal care. In this way alone can the best results be secured for mothers and babies. All other methods or provisions must be considered temporary and inadequate substitutes for complete satisfactory maternity care."

Sweden, the leading country, has about one-third the rate of the United States in maternal mortality and puerperal sepsis. In New York State the mortality from sepsis in the rural sections is less than one-half that in the urban areas.

These startling facts illustrate the contents of the report of the Committee on the Status of Maternal and Infant Mortality from the Child Hygiene Section of the American Public Health Association, which was read by Dr. Julius Levy. The report was divided into three sections:

1. Newer developments in the protection of maternity and infancy during the first year of the committee's existence.
2. A review of relevant statistics of the Bureau of Census, the Children's Bureau and of the State and City Health departments. A number of charts presented graphically the chief significant features of these assembled facts.
3. Two hundred thirty-eight studies or researches were reported in progress in the field of maternal mortality in the hospitals and medical colleges. This committee report was discussed by S. Josephine Baker, M.D.

Higher maternal mortality rate in 1926 than in 1917 is shown in the entire birth registration area, Dr. Blanche M. Haines, U. S. Children's Bureau, reported. The urban death rate for every 10,000 live births was 70 mothers in 1917 and 73.9 in 1926. For the same period the rate in rural districts declined from 62.3 in 1917 to 58.7 in 1926.

Improvement in rural areas, as reported by state directors of maternity and infancy work in states showing greatest improvement, list the following activities as contributing to a lower maternal mortality rate.

1. Educational work—literature, prenatal clinics, nurses' visits, meetings, class groups, and press.

2. Improvement in training physicians in obstetrics in medical colleges, graduate instruction, medical meetings, and the provision of prenatal care.

3. Instruction and supervision of midwives in certain states.

4. Assistance of lay organization of women in promoting educational program.

5. Improved highways.

Increased hospitalization of maternity cases is still an unknown factor.

Further analysis of maternal mortality into specific causes showed: (1) decreased eclampsia, due to prenatal care; (2) decreased sepsis, and (3) an increase in deaths from accidents of pregnancy and labor, possibly due to more operative deliveries.

The second part of Dr. Haines' paper was a progress report on maternal mortality studies in eleven states scattered over the whole country and should give a cross-section of obstetric practices in the whole nation. These studies are planned mostly for two years' duration and should by the end of 1930 furnish data of the factors influencing maternal mortality.

Of 819 maternal deaths in Michigan between April, 1927 and July 1, 1928, 359 were due to septicemia and 167 to toxemias, as reported by Dr. Lillian R. Smith, in discussing Dr. Haines' paper. Abortions were responsible for 231 deaths, of which 206 occurred in married women. Fifty-five per cent of these women had no medical care during pregnancy.

"Obstetrics in the United States is the general practitioner's specialty. It is the nucleus around which the general practitioner builds up a practice, yet it is inadequately taught in practically every medical college of the United States," said Dr. Carl H. Davis, reporting for the Section on Obstetrics, Gynecology and Abdominal Surgery of the American Medical Association. "The health officers of our large cities should investigate the causes of every maternal and infant death," Dr. Davis continued. "If each death was recorded in a special file with the necessary details, valuable information could be secured within a few years. Health officers are the only physicians in a city who can undertake a campaign of publicity." Information which they gather is suitable for presentation before the Section.

"Mortality statistics of the United States show little reduction in the risks of maternity during the last half century," Dr. Davis said in his paper on *Obstetrics at Home and Abroad*. In 1911 Dr. J. Whitridge Williams investigated the obstetric and midwife situation. While some slight improvement has followed, his conclusions apply today. One-half of the answers (to a questionnaire to professors of obstetrics) state that ordinary practitioners lose proportionately as many women from puerperal infection as do midwives, and over three-quarters that more deaths occur each year from operations improperly performed by practitioners than from infection in the hands of midwives.

"At Zurich 1709 babies were delivered in 1926 in one clinic. There were thirteen forceps, two versions, nine craniotomies, and sixty cesarean sections," said Dr. Davis, in reviewing his visit to the clinics in eight European capitals.

"The medical profession has not admitted that maternity care is inadequate," said Dr. Davis, in summing up American conditions. Medical colleges should be the leaders, since they are largely responsible for standards of medical practice, but community cooperation is required to meet the economic need.

"A maternity bill will come before Congress again this winter. Thus far the medical profession has not attempted to correct the situation which caused the Sheppard-Towner legislation. What have we to offer as a substitute?" asks Dr. Davis in concluding. "I believe that this is primarily a community problem which demands cooperation of the medical profession and general public. Physicians should lead the way, otherwise as President Frank, of the University of Wisconsin, pointed out two years ago, some type of state medicine will be forced on us."

"Probably eighty-five per cent of maternal loss of life could be prevented if all women could be cared for in well-organized maternities with competent at-

tendants," said Dr. William C. Danforth, in discussing Dr. Davis' paper. The remedy, he believes, lies in better obstetric education of future generations of doctors and in provision of more adequate hospital care.

Two thousand live babies with no maternal death was the record turned in by Miss Hazel Corbin of the Maternity Center Association, the work being done in a section of New York City. Deliveries are made by the usual attendant, midwife, doctor or hospital intern, the only difference being the intensive educational and nursing campaign with carefully developed routine technique. This included visits by the nurses to the homes, patients' visits to the center, where nurses and doctors were seen and group instruction was given. At the time of delivery a nurse is sent as soon as labor starts and she stays until mother and baby are cared for and some one is instructed to care for them properly afterwards.

By invitation of the New York State Department of Health, a similar demonstration was put on, beginning in 1925, in Tioga County, a dairy farming county in the southwestern part of the state. The Tioga County Medical Society worked closely with the Maternity Center Association, the doctors referring their cases for care. Several physicians required their patients to register with the nurses. Seventy per cent of the mothers in the county were under care the first year; ninety per cent at the end of three years. The rural work proved easier to establish and somewhat simpler to handle. In December, 1927 the demonstration ended and the work was turned over to a local committee, aided by a regular state subsidy and a county appropriation to finance the service.

"The success of the work in Tioga County depended on three factors: (1) cooperation of the County Medical Society; (2) education of the public; (3) a properly trained nursing staff," said Dr. Guy S. Carpenter, member of the Public Health Committee of Tioga County Medical Society, who came on to discuss this demonstration of rural maternity care. He summarizes the results accomplished as:

1. It was demonstrated that a prenatal and maternity nursing service can be successful in a rural county.

2. A systematic and thorough prenatal and maternity nursing service was rendered to a larger number of mothers than was ever before undertaken in a rural community.

3. Interest in maternity work was stimulated in the medical profession.

4. A permanent nursing service has been established, financed by the county with a state subsidy.

"With such a successful demonstration before them, state health officers need hesitate no longer to put on similar demonstrations in their respective states" said Dr. S. J. Crumbine of the American Child Health Association.

For many years sufficient facts have been known and analyzed to show clearly that the United States has one of the highest maternal death rates and why. This meeting in Chicago in October, 1928, is significant, not only for assembling even more striking facts, including a successful demonstration, but because public and child health authorities have taken up the solution of this problem of human waste.

If eighty-five per cent of the maternal deaths are preventable, as one obstetric authority states, perhaps the time is ripe for action. Judging by accomplishment in other medical fields, an American Safe Motherhood Association, or some such name, would serve to crystallize the latent energy awaiting leadership. Obstetric authorities are prepared to give expert advice. Public health workers are accustomed to organize and promote, and the informed public will furnish financial support.

Thus may this challenge be met and the United States become a place of safe motherhood.

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The Readers' Forum

CONDUCTED BY JOHN OSBORN POLAK, M.D.

Readers of the Journal are urged to avail themselves of the facilities afforded by this department for replies to questions in the domain of obstetrics and gynecology. All inquiries should be directed to Dr. John O. Polak, 20 Livingston Street, Brooklyn, N. Y. Replies to such inquiries will be published as soon as possible in this department.

Is Not Cesarean Section Becoming Too General?

Doctor Charles S. Hickman of Centerville, Iowa, writes us: "Can you give me the general attitude of the medical profession regarding cesarean section? Would one be justified in doing a section because the woman preferred it to labor?"

This query only emphasizes what the effect of the *teachings* of a few of our radical obstetric friends has been upon the profession. Cesarean section is the quickest way to get the baby out, hence, the surgical mechanic without knowledge of the physiology and the art of obstetrics is doing sections on women for almost every conceivable indication without appreciating that abdominal hysterotomy carries with it a greater mortality than that of the average clean abdominal section.

In a study of more than 6000 sections conducted by Doctors Holland, Gordon, Beck and myself, the mortality in clean cases operated upon before labor has begun with the membranes unruptured, or just after the beginning of labor is, approximately 3 per cent. After the membranes have ruptured this mortality rapidly rises to 6 per cent; while after intravaginal interference has been tried and section is subsequently elected the maternal death rate has risen from 10 to 20 per cent, dependent on the amount and the type of intravaginal manipulation. Contrast this with a mortality of 3 or 4 of 1 per cent which are the average mortalities in normal labor and the question is answered, for, as we see it, the conscientious physician or surgeon should always give his patient the best chance for her life.

The indications for cesarean section have been generally broadened in the past few years, because of better prenatal study and more accurate estimation of the relative size of the child to the pelvis. Women who formerly would have been given the full test of labor and operated upon during the second stage are now operated upon early in the first stage and so benefit from a lower surgical risk.

Central placenta previa at or near term after blood transfusion, is well handled by section. Certain breech cases with a large child and early rupture of the membranes afford another indication; while prolapsed cord early in labor with but little cervical dilatation justifies delivery by the abdominal route.

Preeclampsia and cardias where subsequent pregnancy is a menace to the woman's future health, admit of section and sterilization (under local anesthesia).

Primarily, section is done in the interest of the child, always accepting the fact that the woman's risk is increased by section in all relative indications—hence, it would not only be a stretch of the physician's conscience, but a stretch of his veracity and his honesty to his patient to advise section versus normal labor, just because this is the easiest way to get the baby out without pain.

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Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

Collective Review

The Obstetric Literature of 1928

By J. P. GREENHILL, B.S., M.D., F.A.C.S., CHICAGO, ILL.

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THIS year's review contains a few really new ideas in obstetrics such as the hormone tests of early pregnancy, a new treatment of pyelitis, a new drug for the induction of labor, and the performance of Porro cesarean sections under direct infiltration anesthesia. The old but nevertheless important problems in obstetrics are discussed as in previous reviews.

PREGNANCY

Physiology.—An investigation was made by Gragert¹ of the various chemical laboratory methods for the diagnosis of early pregnancy. He used the phloridzin, the ninhydrin flocculation, the antithrombin, and the alcohol extract reactions, and he concludes that as yet the chemical methods for the early determination of pregnancy are too inaccurate. On the other hand, the hormone test devised by Aschheim and Zondek² was positive in 77 out of 78 pregnant women and positive in only 3 out of 236 nonpregnant controls. The test consists of injecting 1 to 2 c.c. of the morning urine of pregnant women into young mice and noting the effect on the ovaries. In pregnancy the urine contains a large amount of hormone of the anterior lobe of the pituitary gland and the hormone has a distinct effect on the ovaries of young mice. Louria and Rosenzweig³ carried out the Aschheim-Zondek test in 87 pregnant women and found the test positive in 98 per cent. (This test permits an accurate diagnosis of pregnancy long before the physical examination is conclusive.) Siddall⁴ used gravid blood serum for the same purpose and studied the effect on the uterus and ovaries of mice. Miller and Martinez⁵ injected iodized oil into 15 uteri to detect pregnancy and while a correct diagnosis was made in every case, three patients aborted. Hence, this method is dangerous and unjustified. Albano⁶ injected tetro-thalein intravenously into women and when x-ray pictures were taken of the pelvis, pregnancy was revealed whenever present.

A very thorough review of all the important studies on calcium in the mother, the fetus, and the placenta is reported by Vignes.⁷ He especially discusses the dangers of decalcification and of an excess of calcium. Schönig's⁸ studies lead him to believe that the maternal blood calcium is diminished from the sixth month of pregnancy to term. This is not due to withdrawal of maternal calcium by the fetus but to deviation of the calcium into other channels. (The indiscrimi-

nate administration of calcium to all pregnant women regardless of necessity, or the use of ultra violet lamps to increase calcium metabolism, should be deprecated. The normal diet of a pregnant woman usually contains enough calcium for both mother and fetus.)

Frank and Goldberger⁹ point out that the female sex hormone is found in the circulating blood from the twelfth to the fortieth week of gestation and that death of a fetus after the twelfth week can be recognized by their test. By the injection of insulin Vogt¹⁰ not only produced sterility in rabbits but altered the female sex cells in such a way that after subsidence of the sterility, the offspring were almost entirely females. Fellner¹¹ obtained the same results by injecting feminin, a sex hormone. Vogt believes his experiments confirm the rule that animals which give birth to a number of young at one time, produce especially females in time of distress. Uhlmann¹² injected ovarian hormone into rabbits, permitted them to mate and found an overwhelming number of females in the litters.

To verify Hofbauer's work on the histologic changes in the parametrium during pregnancy, Rossinski¹³ studied the parametria of pregnant rabbits, and of pregnant women who had died by accident and in whom infection could be ruled out. He concludes that while the parametrium undergoes changes in pregnancy similar to the vagina, the picture of phagocytic stimuli described by Hofbauer as a concomitant of every pregnancy is actually explained by trauma to the uterus.

Hartman¹⁴ gives a vivid and interesting description of parturition in the monkey with data on the gestation period and other phenomena incident to pregnancy and labor. The monkey gives birth in the sitting or squatting position, a posture still assumed by a large portion of the human race. Jolly¹⁵ presents evidence to show that the period of human gestation is intimately related to the length of the mother's menstrual cycle. He believes the physiologic period of gestation extends over eleven cycles and not ten as currently assumed.

A simplification of the Thoms method of Roentgen pelvimetry is reported by Heublein, Roberts, and Ogden¹⁶ and a pelvimeter for the direct measurement of the true obstetric conjugate is described by Smith.¹⁷ On the other hand, H. Baumm¹⁸ maintains that most obstetricians have long ago ceased to attribute great importance to pelvic measurements obtained with a pelvimeter. He advocates external measurement of the pelvis by means of the hands after the method of P. Baumm. (As Baumm says, mensuration with a pelvimeter has been given up by many physicians. This is probably due to the fact that in previous years great pains were taken to obtain very exact measurements and too much reliance was placed upon them. After all, the fetal head is the best pelvimeter because its dimensions determine whether or not a pelvis is contracted. Nevertheless pelvic mensuration is of distinct value. It is a serious mistake not to measure carefully a patient's pelvis when she is first seen but to rely upon a test of labor before plans are made for the necessary treatment. The only safe and scientific procedure is to examine and measure the pelvis of every pregnant woman, so that all available information will be obtained before labor sets in. The Thoms method is helpful.)

Abortion.—The treatment of incomplete early abortion is discussed by Novak.¹⁹ He advocates expectant treatment in febrile cases until several days after complete defervescence. Clauberg²⁰ and Burch²¹ likewise recommend conservative therapy for febrile abortions. Gelhorn²²

favors strict conservatism if there are definite complications outside the uterus but if a second examination reveals no complications or tenderness outside the uterus, he uses the sharp curet irrespective of fever. Mgalobeli²³ too favors early emptying of the uterus in cases of febrile abortion unless the infection has spread beyond the uterus. Benthin²⁴ maintains that conservative treatment of febrile abortion is the best but he advocates the insertion of charcoal sticks into the uterus in these cases. (There is no unanimity of opinion concerning the proper treatment of febrile abortion but the number of those who prefer conservatism is increasing constantly. Very good results are obtained by building up the patient's resistance with fresh air, sunlight, nourishing food, tonics, blood transfusion, etc. The uterus can generally be emptied by the administration of quinine orally and pituitary preparations hypodermically. Elevation of the head of the bed favors drainage. After the temperature has been normal for at least five days it is relatively safe to invade the uterine cavity. The sedimentation test and the leucocyte count are helpful laboratory tests. If bleeding demands treatment during the febrile period, a pack usually suffices and the pack should be saturated with a liberal amount of mereurochrome or hexylresoreinol. The presence of pus necessitates surgical drainage.)

Kallinikoff²⁵ reports a series of 1000 induced abortions and describes his technic. (The author lives in Russia where any woman applying for an abortion can have it done but it must be performed by a licensed physician in a public hospital.) Vogel²⁶ studied Russian statistics to determine the effect of abortions on fertility, and he came to the conclusion that the number of births is the same whether women have labors only, or labors and abortions. Furthermore, the incidence of secondary sterility is greater in women who had labors alone than in those who had both labors and abortions. (This article is not clear and the author himself admits that his conclusions do not harmonize with the fact that artificial abortion is a harmful procedure. There is no doubt that criminal abortion much more frequently than full-term labor tends to cause disturbances in later pregnancies and labors.)

During the past year the German literature contained a relatively large number of reports of gangrene of the extremities following abortion or full-term labor. For example, there are reports by Kienlin,²⁷ Brandess,²⁸ Spiegel,²⁹ Goldberger,³⁰ Lork³¹ (2 cases), Schmidt³² (3 cases), and Neumann³³ (4 cases). (In most of these cases, the cause seemed to have been gynergen, an ergot preparation.) Zweifel³⁴ collected 30 cases of puerperal gangrene in which no amputation was performed and all the patients died. He contrasted these cases with a series of 24 patients on whom amputation was performed and 18 survived.

Bland³⁵ is of the opinion that one patient out of every 8 or 10 who had a hydatid mole dies, either as the direct result of the associated hemorrhage or, indirectly, from chorioepithelioma. He reports a series of 10 patients with hydatid mole, six of whom subsequently developed a chorioepithelioma. (The incidence of malignancy in Bland's series is unusually high; for if large numbers of cases of hydatid mole are collected it will be found that the incidence of the subsequent development of chorioepithelioma is not more than 2 or 3 per cent. For this reason Bland's first statement is too pessimistic.)

Complications.—The gall bladder function of 46 pregnant women was studied by Benda³⁶ and in not one case was a gall bladder disturbance found. A similar study was made by Levyn, Beek and Aaron³⁷ who conclude that biliary tract disease in pregnant women is of metabolic origin rather than due to the effect of mechanical pressure. Crossen and Moore³⁸ are of the opinion that cholecystography is valuable in the early months of pregnancy but not in the later months. They believe that cholelithiasis and cholecystitis in women who have children are to be attributed to puerperal infection which might be so mild as to escape attention. Ferguson and Priestley³⁹ believe that the hypercholesterolemia which is normal during pregnancy, predisposes to the formation of gallstones.

The subject of the heart in pregnancy is fully discussed by Frey and Lardi.⁴⁰ In a series of 74 cases, 12 were treated in the early months by abdominal hysterotomy and sterilization under local anesthesia, 43 delivered spontaneously at term and 19 were delivered by the low, cervical cesarean section under local anesthesia. All of the patients recovered. Hamilton and Kellogg⁴¹ give a brief outline of the principal points in heart disease during pregnancy. They believe the easiest way to deliver a patient with a cardiac affliction is by cesarean section and they prefer ether as the anesthetic. Gammeltoft⁴² reports his extensive studies of cardiac patients during pregnancy. (The reviewer is of the opinion that every patient with heart disease who becomes pregnant should be under the care of a heart specialist throughout pregnancy, labor, and the puerperium. Direct infiltration anesthesia with the aid of morphine or pantopon should be used where possible, especially for episiotomy and cesarean section. Most primiparas and many multiparas who have pronounced signs of heart disease should be delivered by the low, cervical cesarean section.)

An excellent paper on syphilis and pregnancy is presented by Gammeltoft⁴³ who believes that every syphilitic woman should be treated during pregnancy with salvarsan and mercury or bismuth without any regard to the date of the initial infection, to a previous intensive treatment and to a negative Wassermann reaction. Philipp⁴⁴ believes that Colles' law is true. Briefly stated the law maintains that a congenitally syphilitic child cannot infect its own mother but can give syphilis to another individual. (Today we know that every mother of a syphilitic child has syphilis.) Profeta's law which maintains that a syphilitic mother cannot infect her healthy child, is not always true. The value of various blood tests for syphilis in pregnancy is discussed by Peltret,⁴⁵ Stillians,⁴⁶ Lafont and Mèle,⁴⁷ Trillat and Rousset,⁴⁸ and Chappaz.⁴⁹ The general consensus of opinion is that the usual blood tests have the same diagnostic value in pregnant as in nonpregnant women.

It is emphasized by Yoakam⁵⁰ that pregnancy causes increased demands upon thyroid function and when the diet is deficient in iodine, it leads to hyperplasia of the gland, hyperthyroidism and congenital goiter in the newborn. The author makes a plea for the use of iodine salt throughout pregnancy. This is a valuable recommendation.

Mathieu⁵¹ reviews some literature on the subject of pulmonary tuberculosis and pregnancy. Gellhorn⁵² points out that therapeutic abortion for pulmonary tuberculosis is of value only in the first three months of pregnancy, and the method he advocates is anterior hysterotomy under local anesthesia. Even at the time of labor inhala-

tion narcosis should be avoided. (The reviewer agrees that in pulmonary tuberculosis as well as in heart disease, the toxemias of pregnancy and other serious complications, local anesthesia should be used wherever possible.)

It is the opinion of Levy-Solal, Laudat and Wolff⁵³ that a permanent glycosuria during pregnancy should always arouse the suspicion of diabetes and calls for a study of the blood sugar both before and after labor. Walker⁵⁴ believes that if a pregnant diabetic woman is treated with insulin and properly dieted there is no ground for terminating pregnancy because a live child will be born and the diabetic condition will not be aggravated by the pregnancy. (Walker is a little too optimistic because occasionally insulin is not successful.)

Karg⁵⁵ collected from the literature 6 cases in which pregnancy followed the occurrence of carcinoma of the cervix and 10 cases where pregnancy occurred in the presence of carcinoma of the cervix and he adds two more of the latter. All 18 patients were treated with radium. In 12 cases there was a spontaneous delivery and all the children were normal. The author believes that cancer of the uterus during pregnancy should be treated with radium because it not only preserves the life of the mother but also saves the baby. (Radiation will most likely replace the older and more dangerous procedures such as the Porro operation and panhysterectomy.)

The influence of fibroids on pregnancy and labor is thoroughly discussed by Polak⁵⁶ who emphasizes that there is a distinct incompatibility between pregnancy and fibroids. Nevertheless, women with uterine myomas go through pregnancy with but little difficulty.

Waldstein⁵⁷ reviewed the literature on the association of epilepsy and pregnancy. Among 23 patients there were 54 pregnancies, of which 40 went to term, 5 ended prematurely, and 9 terminated as abortions. Gestation did not make the epileptic condition worse, for in half the cases there was an actual improvement. Campbell⁵⁸ analyzed the cases of chorea gravidarum which have been reported in literature, and he believes that all the cases have an infectious origin, and that the accompanying lesions in the endocardium and joints have the same etiology. Conservative therapy is sufficient for the mild and moderately severe cases but in the very severe cases, pregnancy must be terminated. Roques⁵⁹ reviewed the literature on the association of epidemic encephalitis with pregnancy, labor, and the puerperium. He found that in general there is a close correspondence in symptomatology between gravid and nongravid women. Labor in some cases causes a marked change for the worse while in others improvement follows delivery.

The Toxemias.—It is the opinion of Gardiner⁶⁰ that vomiting of pregnancy is due to the upright position of the human being and that the inverted ventral posture and sedatives will cure hyperemesis. He also believes that enteroclysis is a safer and more rational guide to the amount of fluid needed than intravenous administration or hypodermoclysis. Speidel,⁶¹ however, favors subcutaneous and intravenous administration of fluids and Péry⁶² advocates the use of insulin for these cases. On the other hand, Titus and Dodds⁶³ maintain that insulin with glucose is of questionable value but insulin without glucose is dangerous. Studies of the latter authors indicate that there are low blood-sugar values in hyperemesis just as there are in eclampsia. This finding supplies a scientific basis for the success of glucose adminis-

tration in cases of pernicious vomiting. (As Titus and Dodds insist, insulin may be dangerous for patients with hyperemesis. If used at all, careful and repeated blood-sugar studies should be made. Large amounts of fluid, glucose without insulin, isolation and sedatives are usually sufficient to cure excessive vomiting of pregnancy. Of great assistance in the treatment is suggestion and occasionally also duodenal tube feeding.)

Ivens⁶⁴ draws attention to the association of latent autogenous infection with the albuminuria of pregnancy. The organisms responsible can be found in the urine. (DeLee⁶⁵ was the first to call attention to the close association of the toxemias of pregnancy and ureteropyelitis.) Kahn⁶⁶ advocates the routine catheterization of both ureters in all cases of pregnancy toxemia or arterial hypertension without symptoms of toxemia. (This procedure as a routine is too radical and unnecessary.)

Mussey and Keith⁶⁷ believe that most pregnant women with acute nephritis recover with little or no demonstrable impairment of renal function and that many women with a history of nephritis but with no gross impairment of renal function can be carried safely through pregnancy under careful supervision. They believe that many patients who have a low grade chronic nephritis or hypertension have more than sufficient renal and vascular function to carry a pregnancy to term. (This is opposed to the general opinion that patients with nephritis should not be permitted to become pregnant or to carry a pregnancy to term. It is very difficult to manage a nephritic pregnant woman so that her condition will not be aggravated and the child will not die in utero before term. Placental pathology such as hemorrhages, gross infarction and abruptio placentae is hard to prevent.)

A long series of painstaking investigations have proved to Titus, Dodds, and Willetts⁶⁸ that contrary to the opinion of many, there is a sudden drop in the blood-sugar content just before an eclamptic convulsion. Their work also verifies the fact that in eclampsia there is a disturbance in carbohydrate metabolism. Hence, the proper treatment for eclampsia is intravenous injections of hypertonic glucose solutions (without insulin) and complete muscular rest. However, Loeser⁶⁹ believes insulin is of value in cases of eclampsia as well as in hyperemesis. (Insulin is unnecessary in the treatment of eclampsia.)

Krieger⁷⁰ emphasizes that fever is frequently present in eclampsia, and he believes it to be of central origin due to cerebral pressure. The fever runs parallel with the cerebral pressure symptoms; hence, a sudden rise in temperature is nearly always accompanied by cerebral paralysis. Laffont and Jahier⁷¹ believe that among the natives of North Africa syphilis is the cause of eclampsia because they found a large incidence of lues among the patients with eclampsia. (This is very poor logic and still poorer scientific acumen.)

In a discussion of the treatment of the toxemias of pregnancy Polak⁷² favors medicinal therapy. Clason⁷³ also advocates medical treatment but interrupts pregnancy if the symptoms become worse in spite of the treatment. Except in the fulminating cases conservative treatment is Falls⁷⁴ method of choice. He advocates cesarean section in rapidly advancing toxemias when proper facilities are available. Basing his opinion upon a study of 449 cases of eclampsia which occurred in the three Viennese obstetric clinics, Herrmann⁷⁵ favors early and quick delivery of all eclamptic patients who can be delivered easily by

the natural passages. Old primiparas and multiparas with undilated soft parts near term should be delivered by cesarean section. (In certain large clinics eclampsia is becoming a rare disease. However, the fact that 5,000 women die from eclampsia every year in the United States means that at least 25,000 women have eclampsia and pre-eclampsia. This is a lamentable fact because eclampsia can be almost entirely prevented by proper prenatal care. Patients with severe toxemias should be treated in a hospital but if a patient must be cared for at home, the most conservative methods will yield the best results. In a hospital an experienced individual will obtain the best results by treating patients individually but not hesitating to empty the uterus in the most conservative way in a large proportion of the cases. Of the greatest importance is the avoidance of a general anesthetic. Episiotomy, forceps delivery, and cesarean section can all be performed under local anesthesia with great ease.)

According to Duncan and Seng⁷⁶ physiologic forces external to the ureters cause an obstruction to ureteral and renal drainage in pregnancy which is relieved almost immediately upon the termination of pregnancy. Kamniker⁷⁷ maintains that delay in emptying of the renal pelvis begins in the first half of pregnancy at the time when there is no stasis and no ureteral dilatation is visible. The delay is most marked in cases of pyelitis. Hofbauer⁷⁸ believes that urinary obstruction in pregnant women is caused by certain anatomic conditions in the juxtavesical portion of the ureter and in the trigonum vesicae. While there occurs after labor a gradual return of the renal pelvis and of the ureter to normal in uncomplicated cases, persistence of both bacteria and marked dilatation of the ureter was demonstrable on reexamination in a considerable percentage of women who had been treated for pyelitis during a preceding pregnancy. The use of pituitary preparations is suggested by Hofbauer on account of their specific antiphlogistic action as well as because of their stimulating effect upon ureteric peristalsis. (In the few cases of pyelitis which the reviewer has treated with pituitrin the results have been encouraging.) Experiments of Hofbauer and Timbres⁷⁹ tend to show that the depressing effect of bile salts on ureteral contractions may be an important factor in the atonic condition of the ureters in pregnant women and that minute doses of adrenalin have a stimulating effect on the ureters.

LABOR

General.—According to Knaus⁸⁰ the onset of labor is due to two factors; namely, increase in contractility and tonus of the uterine muscle during pregnancy and to degeneration of the corpus luteum with its release of the uterine musculature for the complete working of the hormone of the posterior lobe of the hypophysis. Normally both factors are equally active at the onset of labor but in abnormal cases either one may stimulate the onset of labor pains alone. Hofbauer⁸¹ believes that the bile salts play a rôle in the causation of labor.

Wittenbeek,⁸² Hatzky⁸³ and Calmann⁸⁴ favor the induction of labor by means of pituitary extract, while Wigger⁸⁵ praises inhalation of carbon dioxide for this purpose. Temesvary,⁸⁶ the first to use thymophysin which is a combination of pituitary and thymus extracts, praises

this new preparation and so does Liebe.⁸⁷ (Pituitary preparations should be used with great caution toward the end of pregnancy and especially during labor.)

Hoehne⁸⁸ reports the case of a pregnant woman who manifested an idiosyncrasy toward quinine which lasted for five weeks after labor. The child was normal. (A number of instances have been reported where quinine most likely caused fetal death.)

In a very interesting and timely paper on long labor, Bailey⁸⁹ discusses acidosis during labor. He emphasizes that blood pressure readings and where possible checking of the CO_2 will confirm the clinical diagnosis of acidosis. No anesthesia should be given and no operation performed until the blood pressure is 100 or over. This will lead to a diminution of the sudden and obscure deaths that occur at the end of long labors.

Potter⁹⁰ advocates immediate repair of birth canal injuries following deliveries. He not only repairs fresh lacerations but also cuts away any diseased tissue or scar tissue that may be present. Danforth⁹¹ likewise points out the benefits of immediate repair of the cervix after labor. He emphasizes that it is just as logical to repair cervical injuries as perineal lacerations. (The reviewer agrees with Potter and Danforth that every cervical laceration more than 1 cm. in length should be repaired immediately after the placenta is expressed. This means routine exposure of the cervix and for this purpose clean surroundings, good light, assistants and proper instruments are necessary. In the home cervical repair is not advisable except for hemorrhage and even then it may be quicker and safer to pack the uterovaginal tract.)

Analgesia and Anesthesia.—Beckman⁹² reiterates his belief that the alleged synergism of magnesium sulphate and morphine does not occur in the dog and that no satisfactory evidence has been brought forward to show that this synergism occurs in man. Gwathmey,⁹³ on the other hand, maintains that the synergism of magnesium sulphate and morphine has been definitely proved clinically, the value of morphine being increased from 250 to 500 per cent. Lynch's⁹⁴ choice of anesthetic for obstetric cases is nitrous oxide. He does not use morphine, ether, or ethylene for cesarean sections and he employs local anesthetics only for a definite indication, because he considers it brutal. (The reviewer performs practically all of his cesarean sections and even some Porro operations and gynecologic operations under direct infiltration anesthesia and is firmly convinced that local anesthesia, if properly administered, is far from brutal. Morphine and scopolamin are given immediately after the child is born by cesarean section and few women complain of pain. Some patients are half asleep before the operation is ended.)

The German literature contains a number of articles on the use of pernokton to produce twilight sleep. This drug is a combination of a bromide and barbituric acid and is praised by Roettger⁹⁵ and by Vogt⁹⁶ but is looked upon with disfavor by Gauss,⁹⁷ Pankow,⁹⁸ G. Doederlein,⁹⁹ Zweifel,¹⁰⁰ Rupp,¹⁰¹ and Muetz.¹⁰² According to Rupp at least the bromine derivative is transmitted to the fetus. (Recently Kobes¹⁰³ has shown that both the bromine and the barbituric acid are transmitted to the fetus in appreciable amounts and according to Pankow all the babies at birth are ash gray in color.)

Katz¹⁰⁴ reviews 27 deaths from narcotics during pregnancy and labor. Of the 9 deaths during pregnancy, 7 followed the use of chloroform, 1 chloroethyl, and 1 ether. Nine of the 18 deaths during labor followed chloroform and 9 followed ether. During pregnancy status thymico-lymphaticus plays a rôle but in labor the important factors are toxemia and infection, especially pyelitis. (This is another argument for using local anesthesia, wherever possible, especially in cases of toxemia and infection.)

Complications.—In cases where fever is present during labor, Siegert¹⁰⁵ maintains that shortening the labor by operative procedures is always done at the expense of puerperal morbidity. Operative delivery is indicated only when progress has ceased. (This is essentially correct because the duration of labor in uncomplicated febrile cases usually has no influence on the course of the puerperium. If, however, the labor can be terminated by simple measures this should be done.)

Mayer¹⁰⁶ discusses retrodeviation of the cervix during labor. He emphasizes that it is usually the result of a long, anterior wall of the lower uterine segment and advises that when the condition is recognized the external os be centralized by being pulled forward with a finger. (Displacement of the external os far back in the pelvic cavity is not uncommon and should be corrected early.) Mathieu and Schaufli¹⁰⁷ studied the rigid and stenosed cervix during the first stage of labor and they maintain there is no such thing as spasmodic or functional rigidity of the cervix. (In 1922 the reviewer¹⁰⁸ reported a case of true spasm of the external os. Mathieu and Schaufli refer to this case but say they cannot explain it.) The authors also discuss the treatment of cervical dystocia.

Falls¹⁰⁹ calls attention to certain signs and symptoms that seem to be characteristic of cases of bicornate uteri and points out the possible dangers to the mother and fetus. Vidal¹¹⁰ reports a case of maternal tachycardia and arrhythmia following an injection of pituitary extract during labor. (We have seen a few cases of shock after pituitrin.)

Küstner¹¹¹ takes up the question of uterine rupture after previous cesarean section. He points out that all the reports indicate that spontaneous ruptures followed previous injury to the body of the uterus. (This is one of the reasons for the superiority of the cervical cesarean section.) Küstner believes that at least one year should elapse after cesarean section before a new conception takes place. Engels¹¹² reports a case of a woman who had two uterine ruptures after a cesarean section and Cohen¹¹³ reports the seventh case in the literature of rupture of the uterus produced by the Credé manipulation. Abraham¹¹⁴ discusses spontaneous rupture of the uterus and says that a number of authors failed to find scar tissue in uteri which had been subjected to injury including cesarean section. (Greenhill and Bloom¹¹⁵ microscopically studied 37 pieces of tissue removed at the time of a repeated cervical cesarean section from the site of the former operation and found scar tissue in all but six specimens.)

Operations.—DeLee¹¹⁶ discusses fully the treatment of occiput posterior position after engagement of the head. (This article should be carefully read by all because more babies are lost as the result of this position than from any other one cause.) McNally¹¹⁷ praises the Kielland forceps for internal rotation of the head and Schwenke¹¹⁸ believes

the use of these forceps should be taught even to general practitioners. (The Kielland forceps are useful only occasionally and they should be used only by a skilled obstetrician for they may do much harm.) Barton, Caldwell and Studdiford¹¹⁹ extol the Barton forceps. (These forceps also are for the trained specialist and they likewise are better than the usual forceps only occasionally. After all, an experienced obstetrician can perform with the forceps to which he is accustomed, almost everything which is claimed by the advocates of new instruments. Furthermore, version and extraction must not be forgotten, because not infrequently these operations are much simpler and safer than a forceps delivery on a high head.)

The application of a special forceps to a breech is advocated by Framm¹²⁰ while Küstner¹²¹ has devised a hook for the delivery of the breech. (The reviewer has never found it necessary to apply forceps or a hook to a breech.)

The value of routine external cephalic version in uncomplicated breech presentations is emphasized by McGuinness,¹²² while Hertzler¹²³ makes a plea for elective podalic version when there is more or less complete dilatation of the cervix. (Routine podalic version especially in the hands of the unskilled, is responsible for the loss of many newborn babies and for a large maternal morbidity. However, we must be grateful to Potter¹²⁴ for recalling that version [and extraction] is very helpful in many complications of labor and for the development of a skillful technic of performing this operation.)

Ponomareff¹²⁵ reviews all the cesarean sections performed in Russia from 1756 to 1924, and Gordon¹²⁶ analyzes 934 cesarean sections performed in Brooklyn. The maternal mortality for the latter series was 5.8 per cent and the cervical cesarean section yielded better results than the classic operation. Stein and Levinthal¹²⁷ report 40 consecutive cervical operations without a maternal death and Danforth and Grier¹²⁸ report 50 of these operations without mortality. In cases where the bladder peritoneum could not be used to cover the uterine incision Aschner¹²⁹ employed the round ligaments for this purpose. DeLee, Nadelhoffer, and Greenhill¹³⁰ report a series of 91 repeated laparotomies. The total mortality was 2.2 per cent and local anesthesia was used in 60 per cent of all the cases.

Frey¹³¹ extols the use of local anesthesia for abdominal cesarean section and claims that the only contraindication is eclampsia. (The reviewer believes that preeclampsia and eclampsia are two of the most important indications for local anesthesia. As Stander¹³² has shown, all inhalation anesthetics produce toxic disturbances similar to those caused by the toxemias of pregnancy. Hence, the use of inhalation anesthesia in toxemic patients increases the toxemia. Furthermore, one of the most frequent causes of death in eclamptic patients is pneumonia and this complication can be avoided almost entirely by using local anesthesia.) Not only can cesarean sections be performed under local anesthesia but also Porro operations as the four cases reported by Greenhill¹³³ indicate.

Phaneuf¹³⁴ points out the indications for vaginal cesarean section and Groene¹³⁵ reports a series of 116 of these operations. Delmas¹³⁶ advocates forcible dilatation of the cervix at the end of pregnancy in selected cases. He administers spinal anesthesia, manually dilates the cervix and performs version and extraction or applies forceps. The

entire operation lasts only about fifteen minutes and dilatation of the cervix usually requires only about three minutes. (This return to accouchement forcé which we hoped had fallen into well-deserved desuetude, is unfortunate. Great harm can result from widespread use of this procedure even in the hands of specialists.)

Uterine Hemorrhage.—Schroeder¹³⁷ advocates the use of pituitary preparations in cases of atony and hemorrhage before the placenta is expelled and routinely after the placenta is out of the uterus. (We administer pituitrin intramuscularly almost routinely after delivery of the child and have observed only an occasional bad result. The pituitrin should be given immediately after the baby is born for if a few minutes are permitted to elapse, the placenta after separation, may be retained in the uterine cavity by a spasm of the internal os.)

Ward, Lyon, and Bemis¹³⁸ compared the results of oxytocin and pituitary extract and found that there appeared to be a slight difference in favor of oxytocin as regards the oxytocic action. The latter drug does not raise the blood pressure as pituitary extract does, hence, it is desirable in cases with high blood pressure.

In cases of hemorrhage due to cervical laceration and incomplete rupture of the uterus, Zangemeister¹³⁹ maintains, the proper treatment is firm packing of the rent and not suture. (It is much safer to suture torn blood vessels and bleeding cervical tissue than to trust to packing. If, however, the facilities are not at hand, such as clean surroundings, an assistant, long retractors, and good light, one must rely upon tamponade assisted by compression from above.)

Füth¹⁴⁰ reviews 606 cases of placenta previa cared for by midwives and the mortality was 14 per cent. In the 64 cases reported by Douglass and Siegel¹⁴¹ the mortality was 20.3 per cent.

C. J. Miller¹⁴² discusses the hemorrhagic complications of the later months of pregnancy and he believes that cesarean section is indicated in very few cases of placenta previa. On the other hand, Henkel¹⁴³ says that abdominal operation is the method of choice in the majority of cases. Martin¹⁴⁴ praises vaginal cesarean section because he lost only two mothers in the last 120 cases treated by this method. Essen-Moeller¹⁴⁵ believe that vaginal cesarean section is only occasionally necessary in cases of placenta previa. (The reviewer believes that all patients with placenta previa should be sent to a hospital. Most patients who have central or partial placenta previa, and who have lost much blood, should be delivered by the cervical cesarean section under local anesthesia, regardless of the condition of the child. A blood transfusion should be given before, during, or after the operation. If a patient must be treated at home, tight packing of the vagina with cotton pledgets followed by Braxton Hicks version is probably the best procedure. The delivery of the child should be left to the natural forces of labor, else great damage may result from forcible extraction.)

A review of 94 cases of abruptio placentae is reported by Goethals,¹⁴⁶ while Kellogg, Taylor, Eades and Weller¹⁴⁷ discuss this condition with special reference to the kidney in these cases. Contrary to the general opinion that accidental hemorrhage is due to toxemia, Paramore¹⁴⁸ believes that all the consequences of abruptio placentae are due to the bleeding which results from rupture of placental sinuses. Jarcho¹⁴⁹ favors the Mojon-Gabaston injection method of separating the placenta where skilled assistants are not available and asepsis is not perfect.

Sachs¹⁵⁰ recommends that traction on the cord be made at the same time that a Credé expression is attempted before removing a placenta manually. Aschermann¹⁵¹ advocates removal of the placenta in cases of placenta accreta by means of traction on the cord, while Zangemeister¹⁵² condemns this method in no uncertain terms. (There is great danger if traction is made on the cord while the placenta is still attached to the uterus. There is no harm in pulling on the cord if the placenta has been expelled from the uterus and is lying in the vagina; but one must be sure of this before making traction. As a general rule it is best never to pull on the cord except very gently.)

Nathanson¹⁵³ discusses the anatomy, genesis and clinical considerations of placenta accreta and Klaften¹⁵⁴ reports the only case of placenta accreta which recurred in 70,000 labors in the first Woman's Clinic in Vienna. In the literature are reports of 21 operated cases with a mortality of 14.3 per cent, and 24 unoperated cases with a death rate of 87.5 per cent.

PUERPERIUM

General.—Very interesting researches on lactation were carried out by Lowenfeld and Widdows,¹⁵⁵ and also by Harding, Murphy, and Downs.¹⁵⁶ A new test for lactosuria in nursing women is described by Castellani.¹⁵⁷ Thyroid tablets are advocated by Kraul¹⁵⁸ for patients in whom the flow of milk is not free.

Nelson and Pattee¹⁵⁹ examined a number of ergot preparations available in the market and found that only the U.S.P. fluid extracts contain important amounts of the active alkaloids. The ampoules of ergot seem to be wholly devoid of activity. (The ampoules of ergot are not only unnecessary because they are usually inactive, but they not infrequently are the cause of abscesses. We have not used the ampoules in our work for a long time and our results are certainly just as good as when we did use them.)

Sepsis.—Young¹⁶⁰ discusses the maternal mortality from puerperal sepsis in Great Britain, and he emphasizes that trauma is the most important cause of the deaths from sepsis. Findley¹⁶¹ has written an excellent article on puerperal infection and he gives valuable information on how we can improve our results. (However, Findley repeats the statement that we rank highest in maternal mortality and morbidity among 21 leading nations of the world. The reviewer last year pointed out the basis for this fallacious statement, the incorrectness of which is recognized by the Health Section of the League of Nations. The reviewer would like to mention at the present time that Bourne,¹⁶² an Englishman, in his recent book publishes a list of nations and their maternal mortality. The United States is listed as having the highest maternal death rate, but the author points out that if England collected its maternal statistics as did Scotland, England's mortality rate would be higher than that of the United States. If England and Scotland, both constituents of the British Empire and geographically close, differ in their methods of collecting maternal mortality statistics, how much difference is there in countries of different nationalities, geographical limits, temperament, etc. Bourne himself says, "It is not possible to make a close comparison between this country [England] and the United States of America, owing to great variations in administration in various areas." There is no doubt whatever that the maternal mortality in the United States can be very considerably reduced, but it is not greater than it is in other countries.)

Harris and Brown¹⁶³ cultured 50 uteri at cesarean section and found that 22 were infected. With one exception the puerperium of these patients was febrile, but all recovered. The same authors¹⁶⁴ studied 113 cases of streptococic puerperal infection and they believe that viable streptococci do not remain in the uterine cavity until the fifth day of the normal puerperium without giving rise to clinical manifestations of infection. Bryce¹⁶⁵ feels that it is fallacious to regard the presence in the genital passages of streptococci without reference to their biologic character and consideration of clinical features, as evidence that they are causally related to any disease which may exist. Sommer¹⁶⁶ maintains that not only hemolytic streptococci but also every pathogenic organism can cause grave puerperal sepsis. Goodall and Wiseman¹⁶⁷ point out the importance of cervical infections in the puerperium and the train of signs and symptoms which follow these infections. They put forth an ardent plea for active treatment of every form of endocervicitis by cautery and amputation.

Two of the outstanding articles of the year are the contributions of Watson,¹⁶⁸ and Meleney, Zaytzeff and Harvey¹⁶⁹ on the outbreak of puerperal sepsis in the Sloane Hospital in New York City. Watson reports the clinical features of the epidemic while Meleney and his coworkers discuss the epidemiology and bacteriology. (The recommendations made for the prevention of sepsis are most valuable, especially the one concerning the masking of the mouth and nose by all in attendance on a parturient or puerperal woman. These papers can be reread once a year with great profit because the lessons they teach are fundamental in obstetrics.) Allan and Bryce¹⁷⁰ report a similar but smaller epidemic of septic infection which occurred in Melbourne.

Watson¹⁷¹ discusses puerperal infection in general and emphasizes that the majority of all infections come from without but the portal of entry may not always be the external genital tract. He favors conservative treatment. Bonney¹⁷² in a discussion of sepsis makes a plea that obstetrics be given as much consideration and dignity as general surgery.

Delmas and Brémond¹⁷³ recommend the use of sulpharsenol as a preventive measure in puerperal infection and Bär¹⁷⁴ suggests the intravenous injection of alcohol for this purpose. Bernard¹⁷⁵ praises antistreptococcus serum for septicemia, pyemia, and septicopyemia, while Armstrong and Shaw¹⁷⁶ condemn it. (In this country as well as abroad there are very few who have any faith in antistreptococcus serum, as shown by Novak.¹⁷⁷)

Convelaire, Portes, and Digonnet¹⁷⁸ advocate total hysterectomy for certain cases of late hemorrhage in the puerperium, and Solomons¹⁷⁹ reports two cases of puerperal sepsis treated by hysterectomy. One patient died. Desmoyers¹⁸⁰ also favors hysterectomy in certain cases of sepsis. Laffont, Houël, and Ferrari¹⁸¹ report seven cases of ligation of the vena cava. (Aside from the opening of abscesses, surgical operations on puerperal women are generally inadvisable. Only in very rare instances is hysterectomy or ligation of veins necessary.)

THE NEWBORN

Physiology.—From a study of 13,853 births, Hellmuth¹⁸² comes to the conclusion that there is no relationship between birth weight and month of the year. DeLee¹⁸³ reports in detail the method of identification of newborn babies which is used at the Chicago Lying-In Hos-

pital. Greer, Johnson, and Johnstone¹⁸⁴ found that serum albumin does not appear to be frequently a normal constituent of the newborn child's urine, but that its presence accompanies definite clinical disturbances in the mother or child.

In 1923 Skinner¹⁸⁵ reported that he observed 14 goiters in the newborn in a series of 140 confinements. Since that time, he has asked his obstetric patients to take 10 mg. of iodine three times a week, and among 900 prospective mothers, not a single child was born with a goiter from a mother who took iodine regularly. Hence congenital goiter can be avoided by the administration of iodine. (Iodine should be given to nearly every pregnant woman especially if she lives in a "goiter-belt.")

Complications.—From a study of 26 fetuses born of tuberculous mothers but having no contact with them after birth, Calmette, Valtis, and Lacorume¹⁸⁶ conclude that although one cannot deny that tuberculosis may be transmitted by the direct passage of tubercle bacilli through a healthy or injured placenta, this form of transmission is relatively infrequent. On the other hand, transplacental infection by the ultravirus of tuberculosis occurs much more commonly, but this infection is well tolerated.

Reed¹⁸⁷ details an epidemic of impetigo or pyodermitis neonatorum which occurred at the Wesley Memorial Hospital (Chicago) and discusses the etiology and management of these cases. He found that immunogen was an excellent preventative. Holder¹⁸⁸ praises gentian violet for the treatment of impetigo. (Impetigo must be looked for at all times and in every nursery. Prevention is important and instant and strict isolation of every case is most essential. Every hospital has its favorite treatment and perhaps all are equally effective.)

Schmitt¹⁸⁹ studied the late development of children born of previously radiated mothers. Of the 42 pregnancies in 25 women, 8 ended in abortion, 2 terminated prematurely, 31 were full-term, and one patient was still pregnant at the time of the report. All of the 34 children born alive (1 twin) had normal mentality, and the only physical abnormality noted was a case of congenital heart disease. In the discussion of this paper, Karg,¹⁹⁰ Maurer,¹⁹¹ and Flaskamp¹⁹² agreed with Schmitt that radiation does not harm the offspring. Animal experiments led Yamato¹⁹³ to the same conclusion, but Murphy's¹⁹⁴ studies indicate that as yet it cannot be stated that preconception maternal pelvic radium or x-ray irradiation is or is not prejudicial to the subsequent children. However, irradiation of pregnant animals or human beings is a procedure extremely dangerous to the offspring.

It is generally taught that asphyxia neonatorum is a common cause of cerebral birth injury but Ford¹⁹⁵ could not produce brain lesions in cats and kittens by the employment of experimental asphyxia. Henderson¹⁹⁶ discusses the prevention and treatment of asphyxia of the newborn and recommends a special apparatus. Kreiselman, Kane, and Swope,¹⁹⁷ and also Flagg¹⁹⁸ likewise publish accounts of new apparatus for the resuscitation of asphyxiated newborn babies. (These special devices are usually unnecessary if one knows how to insert a moderately hard catheter, size 14 French, into the child's lungs through the trachea. This procedure aided by keeping the baby warm will resuscitate practically every baby which can be reanimated; that is, provided there is no serious intracranial damage.) For the treatment of asphyxia, Wilson¹⁹⁹ advocates the injection of alpha-lobelin into

the umbilical vein. (The reviewer has seen good results from the intramuscular injection of this drug, but has had no experience with the author's route.) Seidentopf²⁰⁰ influences the fetal heart tones in utero in cases of asphyxia by injecting atropin or amyl nitrite into the mother's veins. Spier²⁰¹ also injects drugs into the maternal circulation to overcome asphyxia but Schwarcz²⁰² injects drugs directly into the fetus through the mother's abdomen.

Johnson²⁰³ reports a series of 1,000 fetal autopsies performed at the Sloane Hospital. Serbin²⁰⁴ details 320 postmortems performed at the Chicago Lying-In Hospital. Kamperman²⁰⁵ analyzes 163 fetal deaths, Nathan and Drolet²⁰⁶ review 500 stillbirths occurring in New York City, and Polak and Beres²⁰⁷ analyze 39 stillbirths. (All of these studies indicate the great importance of autopsies on all dead newborn babies even the macerated ones and monsters.)

Kosmak²⁰⁸ reports his second fetal death from intrauterine rupture of a velamentous cord and Torland²⁰⁹ reports a case of fetal death most likely due to quinine. (The reviewer knows of two more unpublished cases.) Falls²¹⁰ gives a group of signs and symptoms which are strongly suggestive of a deformed fetus in the uterus and Kratsch²¹¹ who studied 17 anencephalic monsters found a hypoplasia of the cortex of the suprarenal glands in all of them.

The Placenta.—According to Grosser²¹² the morphologic characteristic of the human placenta is the uniform intervillous space and the physiologic characteristic is the elimination of the vis a tergo or the motor of the maternal blood stream.

Kurtz²¹³ believes that if a placenta is immersed in water and it lies obliquely it is intact. However, if it assumes and maintains a vertical position, or if it lies at the bottom of the container it is not intact. Inflammation of the amnion and chorion was found by Siddall²¹⁴ 48 times in 1,000 consecutive placentas.

MISCELLANEOUS

A study by Pickett²¹⁵ of the results of prenatal care indicates the vast importance of this branch of obstetrics. Bailey²¹⁶ reports on five years' activity of the Maternity Service of the Second (Cornell) Division of Bellevue Hospital. C. J. Miller²¹⁷ records his observations on the differences in obstetric complications between white and colored women. He points out that obstetric injuries with the exception of fistulas are decidedly less frequent in colored women.

Johnstone²¹⁸ discusses the preventive frame of mind in obstetrics and makes a number of useful suggestions. In his presidential address, Litzenberg²¹⁹ discusses maternal mortality. He emphasizes that if the family physician who cares for at least 80 per cent of pregnant women will give them prenatal care, diagnose carefully position and presentation, be meticulously aseptic, stop unnecessary intervention, never do an operative delivery before complete dilatation, and at all times appreciate the dignity of obstetrics, the maternal and fetal mortalities will drop at once.

Greenhill²²⁰ discusses the rôle of motion pictures in obstetrics and emphasizes their special value in teaching. (At the Chicago Lying-In Hospital, Dr. DeLee has completed a number of interesting films which may be rented by physicians or medical societies.)

Bowdoin²²¹ deals with the midwife problem in Georgia and shows that in that state midwives are necessary. Findley²²² in a discussion

on the teaching of obstetrics points out that in this country the ratio of teaching hours of surgery and obstetrics is four and one-half to one which is greater than it is anywhere else in the world. Obstetrics should have a large place in the curriculum of medical schools because in general practice, obstetrics far exceeds general surgery in importance and is only second to internal medicine. One of the most stirring accounts of the hardships of obstetric practice is related by Miss Breckenridge²²³ who discusses the frontier nursing service in the Kentucky mountains. (Every physician should read this article.)

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Selected Abstracts

Miscellaneous

Firgau, L.: The Increase in Basedowoid Disease in Women Since the War and Its Explanation. Klinische Wochenschrift, 1926, v, 890.

Firgau uses Stern's classification of "Basedowoid" as a symptom complex, with the following subjective symptoms: Muscle weakness, nervousness, memory weakness, inability to concentrate, tremors, palpitation, excessive perspiration, loss of hair, and irregular menses. The objective findings of this condition include a small soft thyroid, a weak voice, many of the stigmas of hysteria, vasomotor disturbances, widened palpebral fissures, often positive Graefe, Möbius, and Stellwag signs, a fine tremor and a low volume, soft, arrhythmic pulse.

This symptom complex increased to such an extent in the post-war period that the author has studied the problem and presents statistics. Of 270 women examined in the Koenigsberger Krankenhaus, ranging in age from nine to eighty-two years, over 28 per cent presented this picture of Basedowoid disturbance. On the other hand, 41 per cent of 183 patients between the ages of sixteen and forty-nine years, i.e., during the active sexual life, presented this same picture.

The author feels that this symptom complex is produced by a derangement of the vegetative nervous system, with an accompanying hypertrophy of the thyroid gland, and is not due to a derangement of thyroid function alone. Furthermore, since the greatest incidence occurs during the active sexual life of the woman, Firgau believes that disturbances of the normal sexual life play an important rôle. Of the 75 cases between puberty and the menopause, 45, or a majority, gave a history of abnormal or disturbed sexual function.

RALPH A. REIS.

Warren, S. B.: The Effects of Amniotic Fluid on Serosa and Serous Surfaces,
Arch. Path. 6: 860, 1928.

Based on the assumption that the amniotic fluid may have as one of its chief functions, the prevention of adhesions between the fetus and the amniotic sac, Warren used this fluid or an extract of it in an attempt to prevent adhesions following abdominal operations. He performed a series of carefully controlled experiments on guinea pigs and other animals. His technic was essentially as follows: After properly preparing the skin of the abdomen, he made an incision which exposed several loops of bowel. He then scarified the peritoneal coats as well as the parietal peritoneum and sutured the abdomen. No great care was exercised in the asepsis. Following this, intraperitoneal injections of 10 c.c. of warm, sterile amniotic fluid were given. The controls received 10 c.c. of warm sterile salt solution; other controls received no injections.

Some animals were treated with powdered amniotic concentrate but it was difficult to keep this preparation sterile.

The author concludes from these experiments that amniotic fluid or amniotic concentrate may be used without ill effect in the peritoneal cavity of animals. The amniotic concentrate, prepared by fractional alcoholic precipitation has many advantages over the whole fluid, viz., the amount of protein is reduced, the concentrate is sterile, stable, and easily handled. The fluid does not interfere with healing. Amniotic concentrate added to heparinized plasma did not retard growth of fibroblasts in tissue culture.

The action of the fluid in preventing adhesions is probably due to two factors. The first is the marked reduction in the time of oozing of injured tissues. This lessens the amount of blood and fibrin on their surfaces and therefore restricts the tendency to form fibrinous adhesions. The second is the slow rate of absorption of the fluid, permitting it to remain as a lubricant between eroded surfaces until the period is past when adhesions are most likely to form.

These results seem to indicate that amniotic fluid is safe almost as a routine procedure in abdominal operations in the human. The amniotic concentrate is safe, more convenient and practically as effective as whole amniotic fluid.

Obstetricians need have no fear of amniotic "spill" in cases of cesarean section. Uninfected amniotic fluid can do no harm and is even of value in preventing adhesions.

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